



| Manual IMPACT20 EtherNet/IP

- | System Description
- | Configuration
- | Mounting and Installation
- | Diagnostics and LED Displays
- | EtherNet/IP Bus System
- | Technical Data

Publisher's Note

Ethernet/IP

IMPACT20 E DI16

Article Number: 56 916

IMPACT20 E DI8 DO8

Article Number: 56 917

IMPACT20 E DO16

Article Number: 56 918

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Service and Support

Website:

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In addition, our Customer Service Center (CSC) will be glad to assist you:

Our Customer Service Center can support you throughout your project during planning and the conception of customer applications, configuration, installation, and startup. We also offer competent consulting or – in more complex cases – we even provide direct onsite support.

The Customer Service Center provides support tools. It performs measurements for fieldbus systems, such as PROFINET DP, DeviceNet, CANopen, and AS interface, as well as energy, heat, and EMC measurements.

Our coworkers at the Customer Service Center provide their competence, know-how, and years of experience. They are familiar with how products made of various hardware and software manufacturers interact.

You can contact the Customer Service Center at

telephone number +49 (0) 71 91 47-424

or by email at csc@murrelektronik.de.

About the User Manual and its Structure

Bus Manual:

General explanations and functions for each bus.

On this subject, please click on the links to the next page.

System/Product Manuals:

Describe the system and product-specific features.

Art. No.	Designation
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56931	IMPACT20 Profibus
56932	IMPACT20 CanOpen
56933	IMPACT20 DeviceNet
56934	IMPACT20 EtherCat
56935	IMPACT20 EtherNet/IP
56936	IMPACT20 ProfiNet

www.murrelektronik.com

The following links will provide you with more information on bus systems, as well as the standards and specifications on which they are based:



>>> ODVA (www.odva.org)

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Important Information

Basic Knowledge Required

This manual contains general information on the system and the product.

To understand this manual, you need to know about automation systems.

Symbols and Icons

This manual contains information and instructions you must comply with in order to maintain safety and avoid personal injury or damage to property. They are identified as follows:



Notes indicate important information.



Warnings contain information that, if ignored, may cause damage to equipment or other assets or, if you fail to comply with safety precautions, may constitute a danger to the user's health and life.



These instructions are recommendations issued by Murrelektronik.

Intended Purpose

Before starting the devices, read this manual carefully. Keep it in a location that is accessible to all users at all times.

The products that are described in this manual were developed, manufactured, tested, and documented in compliance with the relevant safety standards. In normal cases, these products do not constitute any danger to persons or objects, provided the handling specifications and safety instructions described in this manual are observed. They meet the specifications of the European EMC Directive (2004/108/EC).



WARNING

Devices from the IMPACT20 series are not safety devices conforming to the relevant standards.

Do not use the OFF state of the outputs to implement safety-related requirements of the system/machine.

The products are designed for industrial use. An industrial environment is defined as one in which loads are not connected directly to the public low-voltage power grid. Additional measures must be taken if the products are used in private, business, or trade environments.

The safe, troublefree functioning of the products requires proper transportation, storage, mounting, and careful operation. Operation of the devices for their intended purposes is only guaranteed when the devices are fully mounted.

Current safety and accident prevention laws valid for a specific application must be observed for the configuration, installation, setup, maintenance, and testing of the devices. The power supply must comply with SELV or PELV. Power sources in accordance with EN 61558-2-6 (transformer) or EN 60950-1 (switched-mode power supply) meet these requirements.

Only use cables that meet the requirements and regulations for safety, electromagnetic compatibility, and, if necessary, telecommunications terminal equipment specifications.



Information on cables and accessories made by Murrelektronik GmbH for this product is contained in Chapter Accessories.

Qualified Personnel

Only qualified, trained electricians knowledgeable in the safety standards of automation systems may configure, install, set up, maintain, and test the devices. The requirements concerning qualified personnel are dependent on the requirements profiles described in ZVEI and VDMA. For this reason, electricians must know the contents of the manual "Weiterbildung in der Automatisierung" (Further Training in Automation Systems) issued by ZVEI and VDMA and published by Maschinenbau-Verlag, Post Box 710864, 60498 Frankfurt, Germany) before installing and maintaining the devices. They are therefore electricians who are capable of assessing the work executed and any possible dangers arising from this due to their professional training, knowledge, experience, and their knowledge of the pertinent standards; or who have a level of knowledge equivalent to professional training due to their many years of activity in a comparable field.

Only Murrelektronik technical personnel are allowed to execute work on the hardware and software of our devices, if they are devices not described in this manual.



Unqualified tampering with the hardware or software, or failure to observe the warnings cited in this manual may result in severe personal injury or damage to property.

1 System Description

1.1 Description of the Impact20 Product Family

IMPACT20 is a compact fieldbus I/O station. It combines 8 inputs and 8 outputs or 16 inputs or 16 outputs in a confined space. Due to its compact dimensions, the IMPACT20 is designed for use in switch cabinets, terminal boxes, and on control panels. An IMPACT20 module comprises a fieldbus-specific connection and a fixed number of I/O slots. The I/O functions are module-dependent and are unchangeable. All I/O connections are designed as spring-loaded clamping terminals. They are clearly arranged so that functional relationships are logically recognizable.

The IMPACT20 product family groups signals at I/O level decentrally and places this information on the fieldbus (e.g. Ethernet/IP).

Fieldbus Protocols

Impact20 is supplied for the following fieldbus protocols:

- PROFIBUS
- CANopen
- DeviceNet
- EtherCAT
- Ethernet/IP
- Ethernet/IP

Module variants

- Module with 16 digital inputs
- Module with 8 digital inputs and 8 digital outputs
- Module with 16 digital outputs

Functions

- Easy to recognize, directly assigned status and diagnostic LEDs
- Clear, unmistakable slot designation
- Signal identification on the module
- Terminal-specific disconnection in the event of an error
- Group diagnostic and single-channel short-circuit diagnostic over the bus

1.2 System Components

1.2.1 Product Designation Code

The designation of the IMPACT20 product family is based on a scheme that indicates the fieldbus and I/O function of individual devices.

Examples:

Name			Description
IMPACT20	E	DI8 DO8	
			I/O channels D = Digital I = Input O = Output
			Fieldbus System P = ProfiBus C = CANopen DN = DeviceNet EC = EtherCat E = EtherNet/IP PN = PROFINET IO
			Product Family

Fig. 1: Example of product designation

1.2.2 Product Overview

Article Number	Description
56 916	IMPACT20 E DI16
56 917	IMPACT20 E DI8 DO8
56 918	IMPACT20 E DO16

Tab. 1: ETHERNET/IP fieldbus modules

1.2.3 System Design Principle

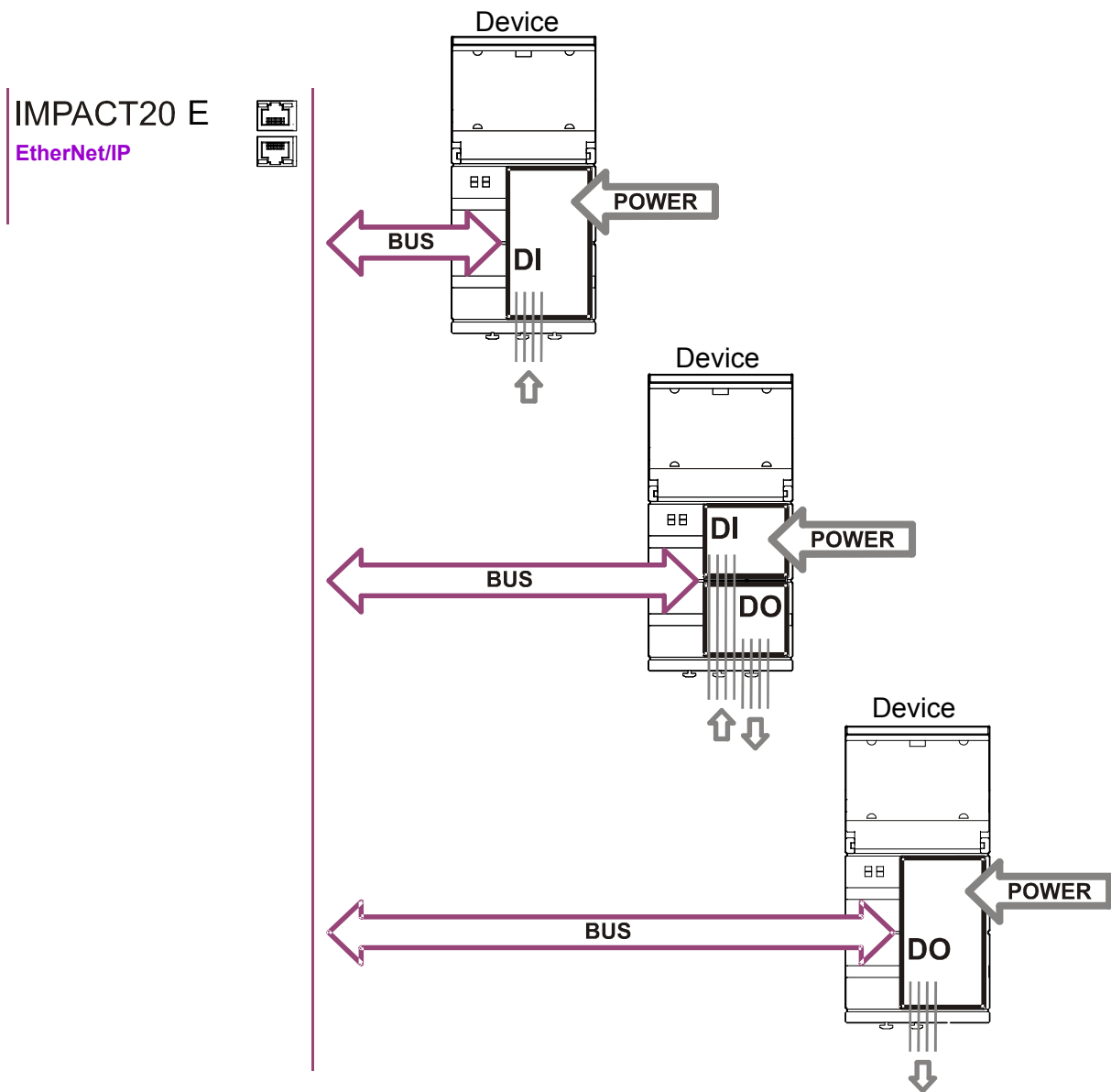


Fig. 2: System design principle

2 Configuration

This chapter contains information that is relevant during the electromechanical planning phase.

2.1 Power Supply

2.1.1 Configuration Notes

Bus modules require a DC voltage power supply of typically 24 VDC (SELV / PELV) that must comply with the regulations for conventional industrial power supplies.



To optimize immunity from interference, we advise you to tap sensor, bus and actuator power supply from a number of different power sources. Primary switched-mode or regulated power supplies should be used.

Power supply unit performance is dependent on the number and power requirements of the connected users.



In any case, make sure that the system voltage – measured at the most remote slave – does not drop below 18 VDC when viewed from the system power supplies. System response becomes undefined if the sensor and bus power supply drops below 18 VDC. IMPACT20 modules then generate an undervoltage diagnostic visually and over the fieldbus.



Primary switched-mode power supply units generally permit an increase in output voltage via nominal voltage in order to compensate for line losses.

Modules with digital inputs support the direct connection of commercially available sensors. Depending on the total power requirements resulting from the number of slaves, or the use of sensors with high power consumption, a separate power supply may be required for the sensors.

2.2 Galvanic Isolation

To optimize electromagnetic compatibility and increase bus stability, the bus must be galvanically isolated from the remaining electronics.

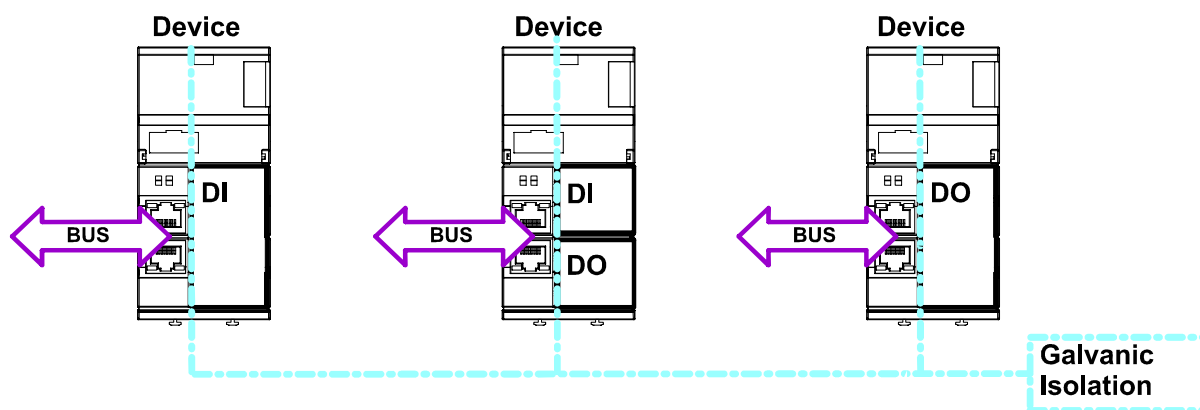


Fig. 3: Impact20 modules – galvanic isolation

2.3 Electromagnetic Compatibility (EMC)



The units comply with the requirements of EC Directive 2004/108/EC "Electromagnetic Compatibility".



These units conform with Class A devices. They may cause radio interference in residential areas. In this case, the operator may be required to implement suitable countermeasures.

The devices described in this manual meet the relevant standards for electromagnetic compatibility in themselves. However, this does not assume that their electromagnetic compatibility is also guaranteed when built into a system.

For this reason, the user is urgently advised to observe the instructions below concerning installation in accordance with EMC requirements.

Protection Against Electrostatic Discharge

The products described in this manual contain complete semiconductor components that may be destroyed or damaged by electrostatic discharge (ESD).

Damage does not necessarily lead to an immediately detectable failure or malfunction. However, it may become evident with a delayed reaction or sporadically.

When handling these devices, make sure that the safety precautions for ESD-sensitive devices that are well-known in general practice are maintained. In particular, note the following items:



Do not disconnect or connect plugs or connectors live.

The person handling the devices must discharge themselves electrostatically before they come in direct contact with the devices, e.g. by touching a grounded part of the system, or by wearing an ESD antistatic wrist strap connected to ground.

Grounding

A short (as short as possible) low-impedance connection is required between the grounding point and reference ground to discharge interference voltages that act between the device and reference ground.

The inductance of normal FE cables represents a high impedance for high-frequency interference voltages.



Make sure that the DIN mounting rail, on which the device is mounted, has a low-impedance connection to ground.

Wiring Arrangement

Avoid EMC problems by keeping to the following basic rules of wiring arrangement:

- Route the data wiring at the greatest possible distance from the power lines. Keep a minimum distance of 10 cm.
- Only cross data and power lines at right angles.
- Route data wires and power cables in separate, shielded ducts.
- Take into consideration the potential interference of other devices or wires when arranging wires.
- Keep the greatest possible distance from frequency converters, motor cables, and other devices, and from cables that emit high-frequency interference.

Power Failures and Dips

Transient power failures and dips (<10 ms) do not normally impair operation since the power supply to the electronics is buffered by integrated capacitors. However, this does not apply to the power supply of sensors and actuators connected to the module. Their high power demand can not be met by capacitors integrated in the device. For this reason, short-term interruptions in actuator voltage may cause undesired switching operations.

If an input signal that lasts for less than 1 ms changes, the input filters prevent the change of the input state reported to the controller. Longer interruptions to sensor power supply may lead to an input signal change.

Separate Power Supplies

Sensors and actuators can be powered by a separate power supply unit. A separate power supply improves the electromagnetic compatibility of the overall system.

Suppression of Inductive Loads

The outputs of the devices described in this manual have an integrated protection circuit against high-energy interference voltages, e.g. that occur when inductive loads are switched.

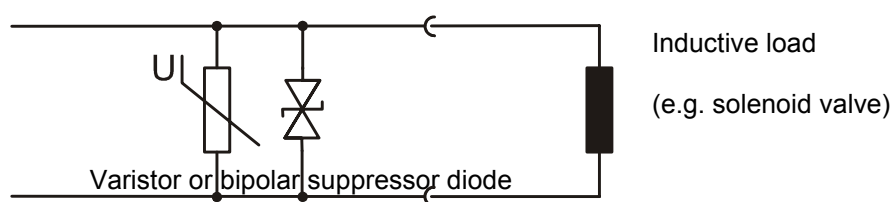


Fig. 4: Suppression of Inductive Loads

A suppressor diode guarantees rapid reduction in the energy stored in the magnetic field of an inductive load. However, with inductive loads, e.g. loads within the maximum current carrying capacity range of a channel and at switching frequencies > 1 Hz, we advise the use of commercially available protection circuits that are capable of reducing the energy stored in the connected inductances.

The high voltages when inductive loads are switched off generate strong fields in the wiring and this may lead to interference in adjacent circuits or devices.



Murrelektronik offers a wide selection of suppressor products. Refer to our catalog or visit our online shop at www.murrelektronik.com

Other Measures and Limits

In specific system configurations, the requirements for interference emission and immunity from interference can only be met with additional measures since the EMC within a system is dependent on the individual components made by other manufacturers.

Mains filters are a suitable measure to reduce cable-bound interference. Various manufacturers offer optical-fiber converters. This type of data transmission is basically immune to EMC interference. However, it does not apply to the converter electronics. Therefore, use of fiber-optics does not eliminate all EMC problems.



Our accredited test center will answer any further queries you may have concerning EMC. There you will receive advice on certain methods to conform with the EMC Directive for the systems you have built.

Murrelektronik-Prüfzentrum (Test Center),

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3 Mounting and Installation

3.1 Mounting

3.1.1 Mounting IMPACT20 Modules on DIN Mounting Rails



Make sure that the DIN mounting rail, on which the device is mounted, has a low-impedance connection to ground.

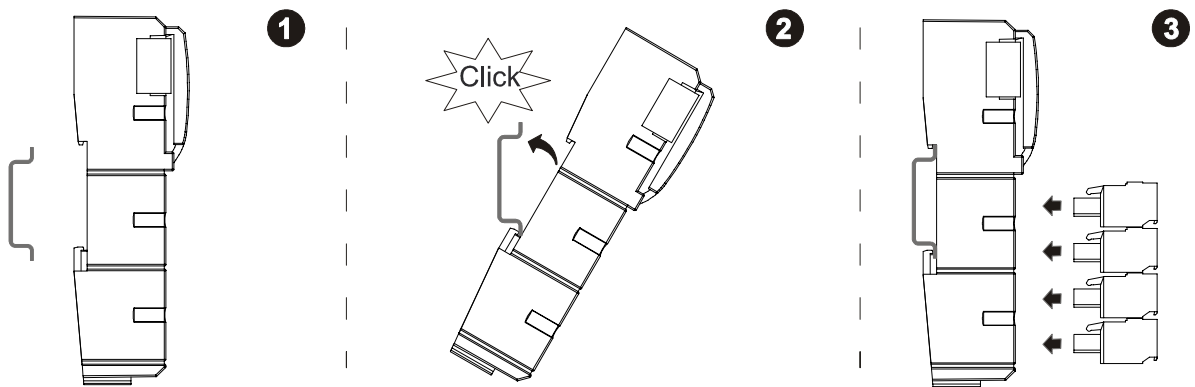


Fig. 5: Mounting IMPACT20 modules on DIN mounting rails

3.1.2 Distances

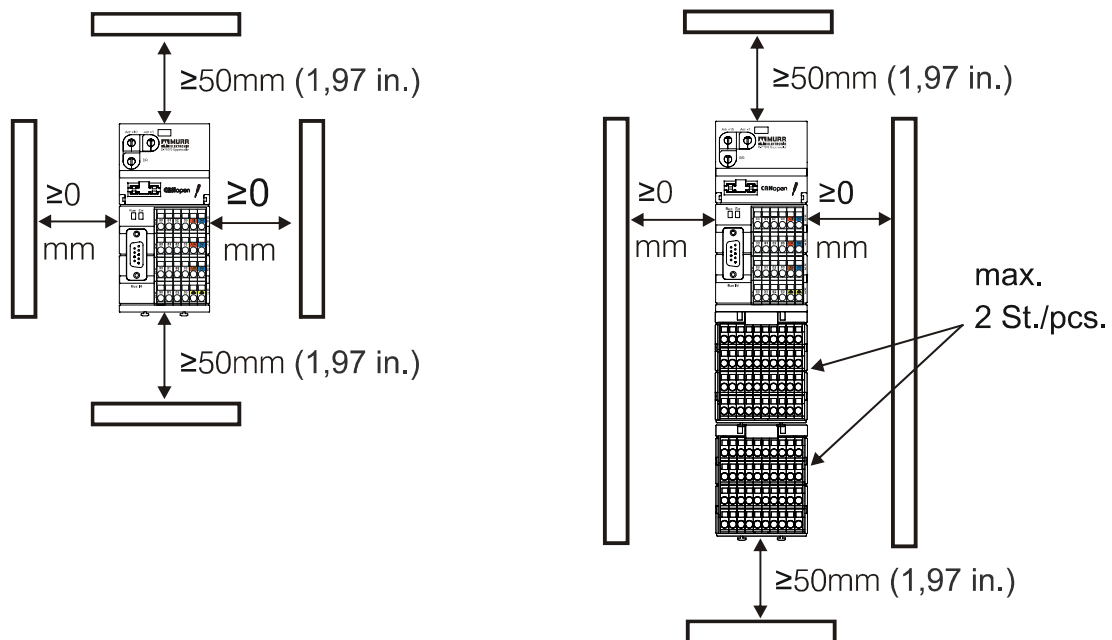


Fig. 6: Distances

3.1.3 Installation Position

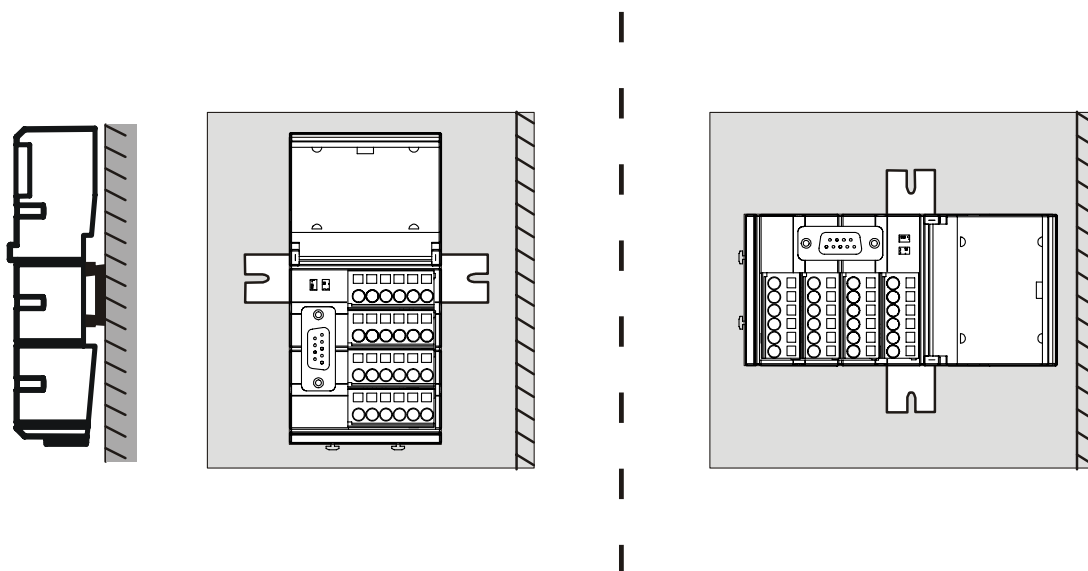


Fig. 7: Installation position

3.1.4 Addressing

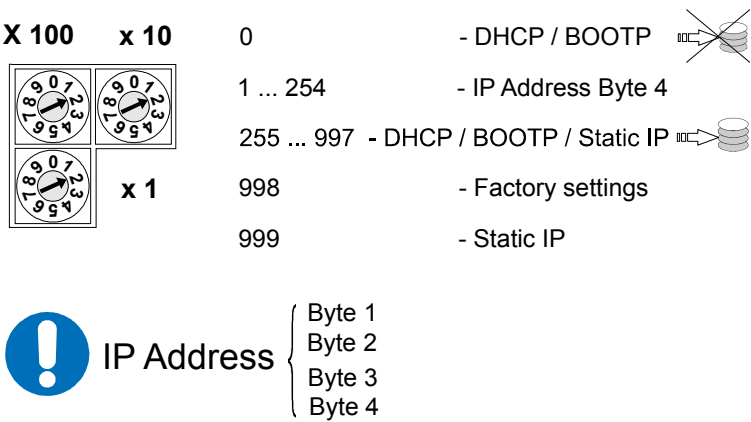


Fig. 8: Setting addresses on IMPACT20 modules

Further information on addressing is contained in the chapter on Startup.

3.2 Wiring Terminals

3.2.1 Connecting Sensors and Actuators



WARNING

Devices from the IMPACT20 series are not safety devices conforming to the relevant standards.

Do not use the OFF state of the outputs to implement safety-related requirements of the system/machine.

3.2.1.1 Sensor Power Supply

Sensor can be powered by the IMPACT20 module. The sensor power supply is protected by a self-resetting short-circuit proof transistor for each module. The maximum current draw for the sensor power supply is 0.7 A per module.

3.2.1.2 Actuators

The maximum current draw of IMPACT20 modules per channel is 2 A. Please remember that the maximum total current of 8 A at the UA terminal may not be exceeded.



CAUTION

If the polarity of the module and actuator power supplies are reversed, this may damage the module.

3.2.2 Terminal Overviews of IMPACT20 Modules

3.2.2.1 DI16 Modules

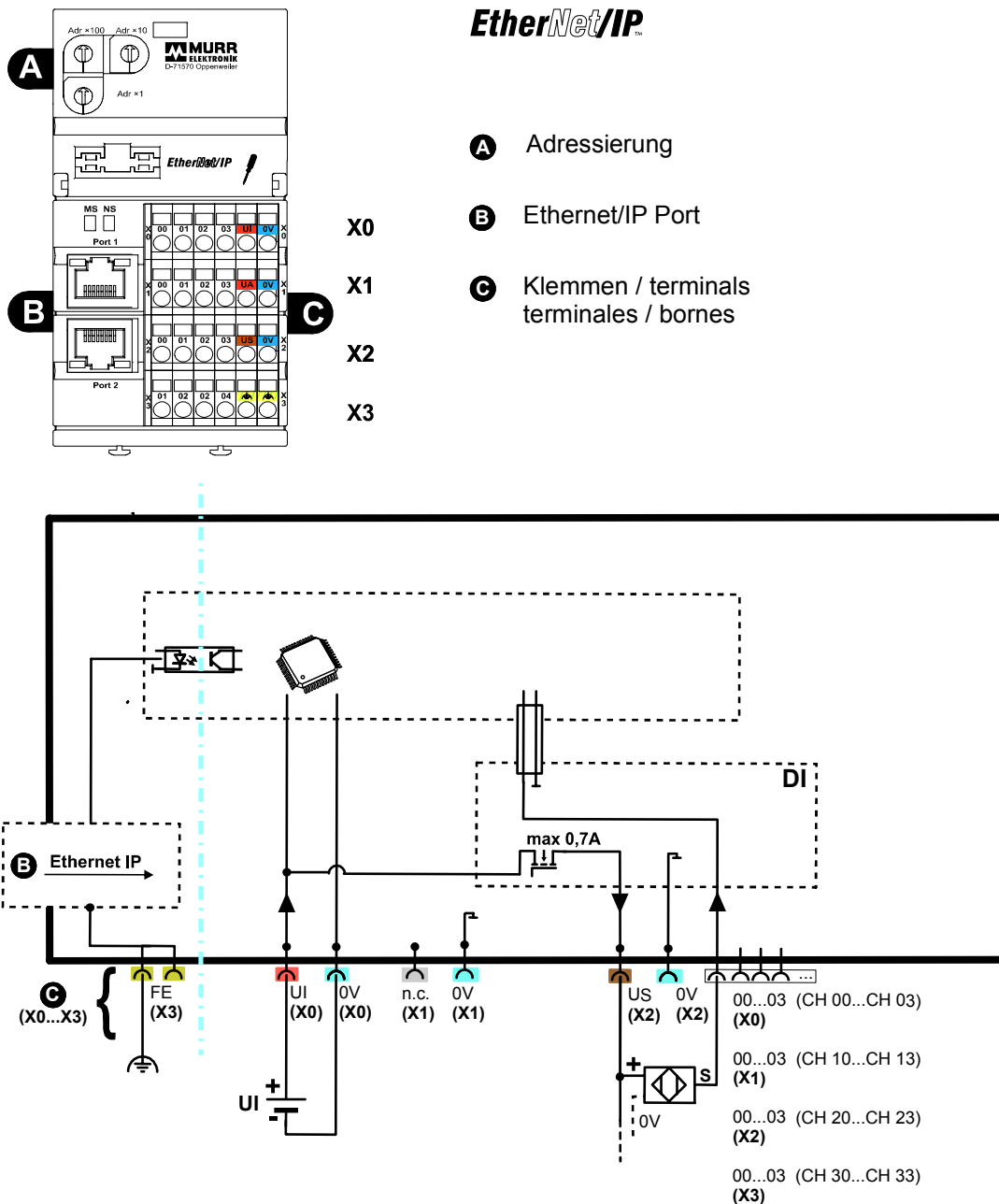


Fig. 9: Terminal overview of Impact20 DI16 modules

3.2.2.2 DI8 DO8 Modules

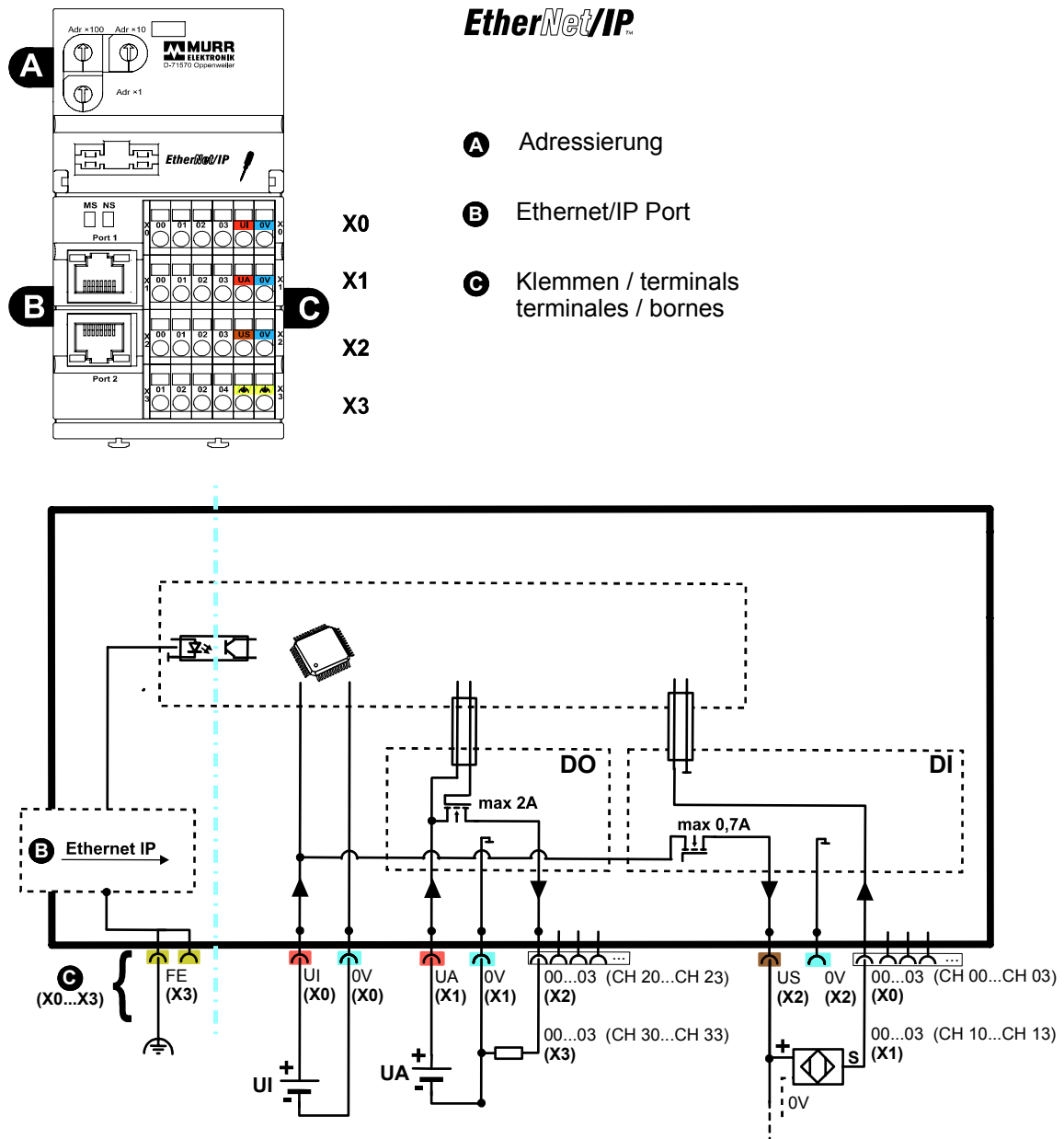


Fig. 10: Terminal overview of Impact20 DI8DO8 modules

3.2.2.3 DO16 Modules

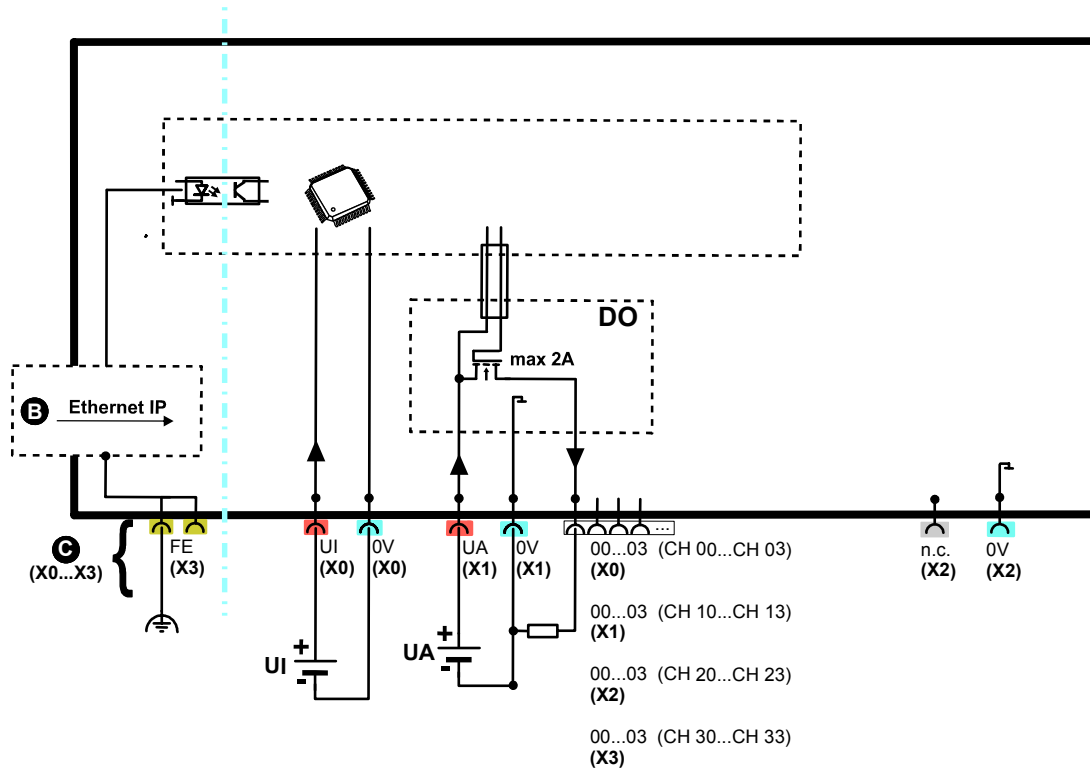
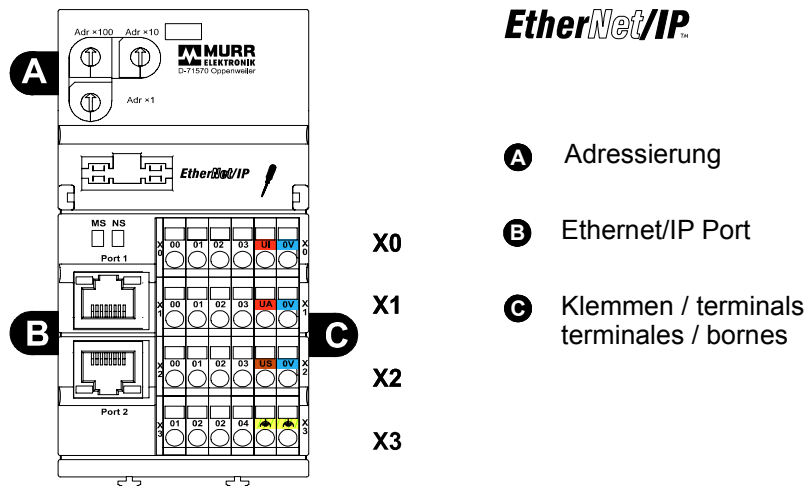


Fig. 11: Terminal overview of Impact20 DO16 modules



Murrelektronik offers label sheet Art. No. 56113 to label the terminals. Please refer to our Catalog.

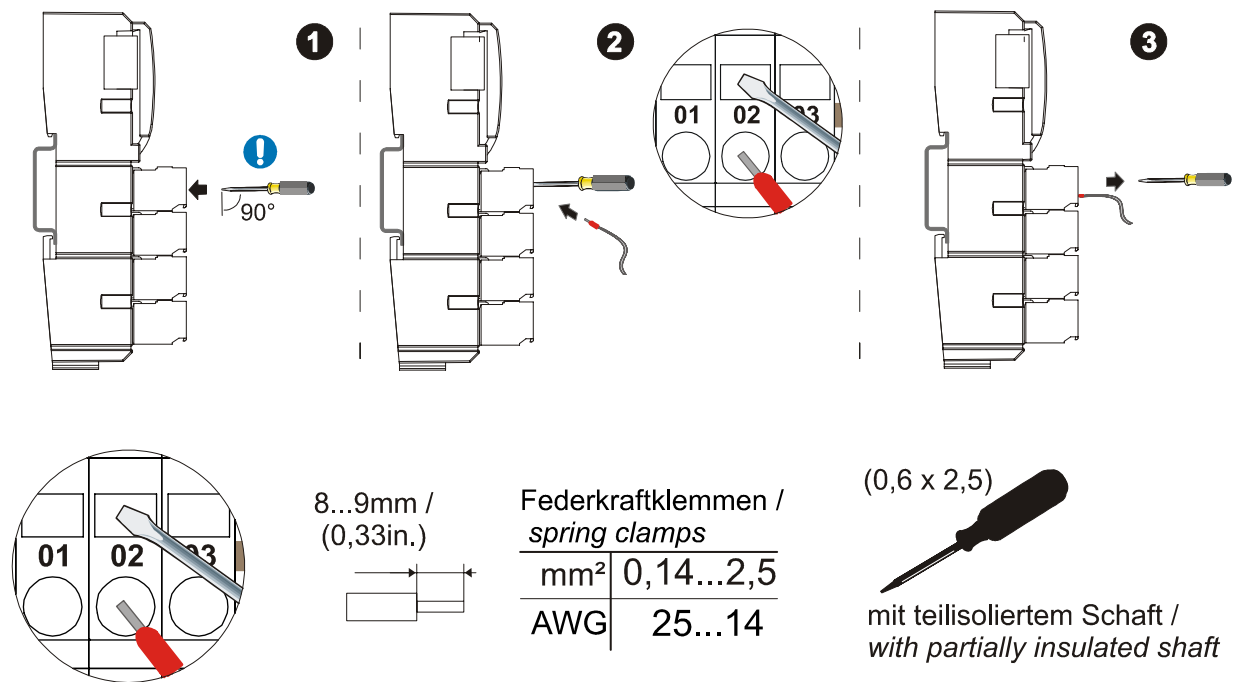


Fig. 12: Wiring terminals

3.2.2.4 Removing terminals

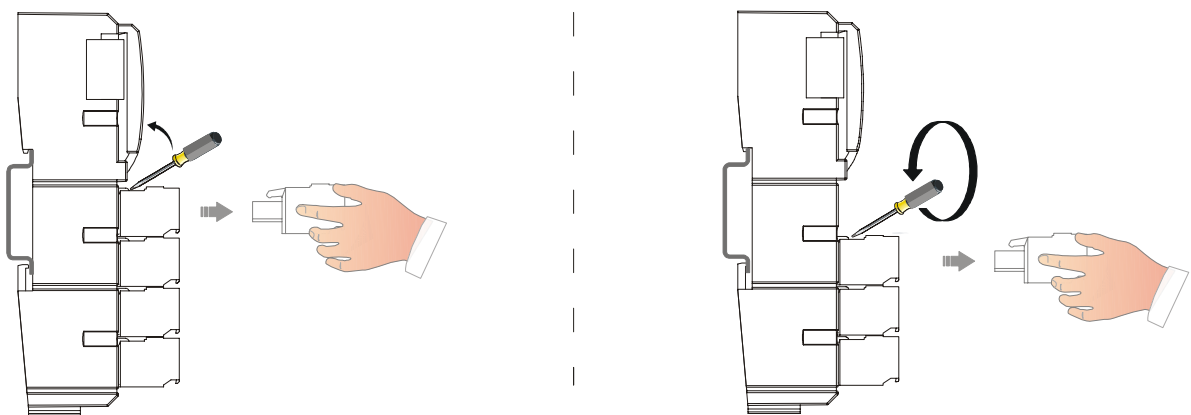


Fig. 13: Removing terminals

3.3 Installing the ETHERNET/IP

Impact20 modules can be integrated in the ETHERNET/IP network in star or bus topologies.

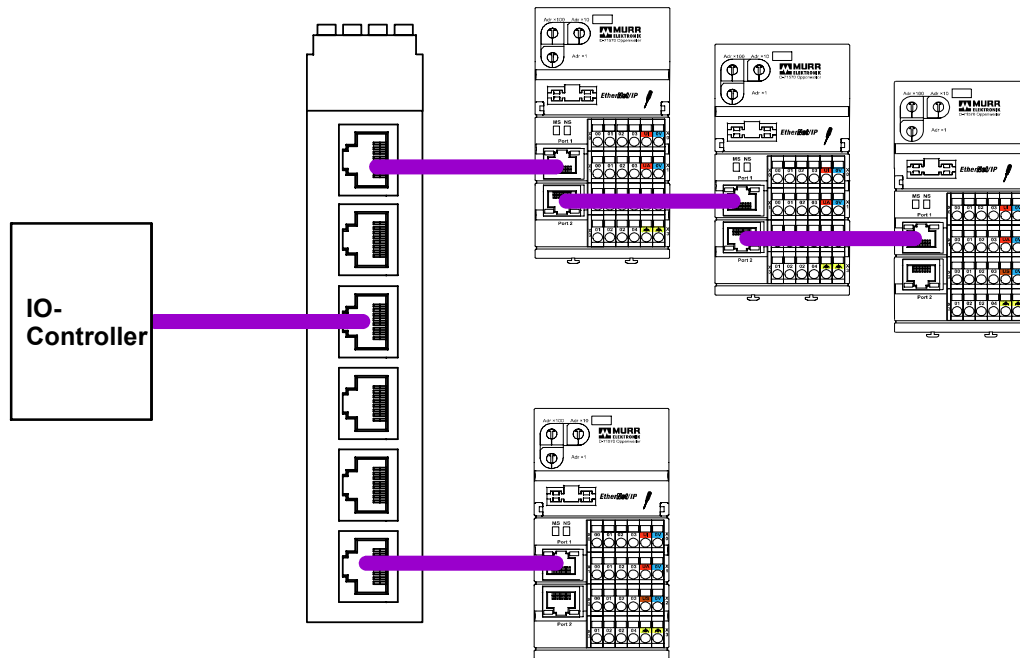


Fig. 14: ETHERNET/IP system in star topology

Two RJ45 sockets for ETHERNET/IP are located on the Impact20 module. One socket is for incoming signals, the other is for looping through the ETHERNET/IP.

A maximum of 9 modules can be connected in series.

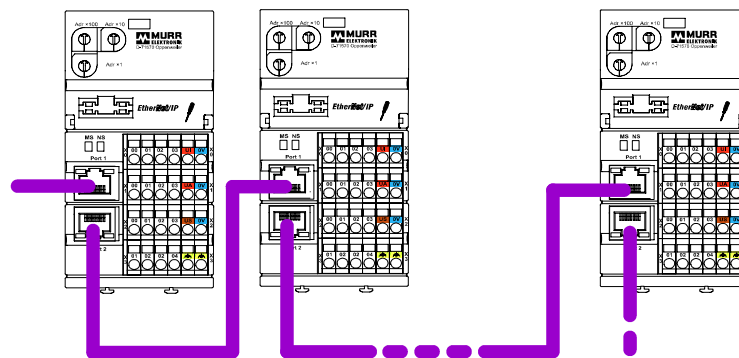


Fig. 15: ETHERNET/IP in bus topology

4 ETHERNET/IP Bus System

4.1 Startup

First use the rotary switch, a DHCP/BOOTP server, or the web server to assign an IP address to all connected IMPACT20 modules. Please refer to the next chapter "Issuing and Setting the IP Address" for precise instructions. In any case, make sure that you issue each address only once.

Then connect your IMPACT20 modules by means of an RJ45 Ethernet cable to an EthernetIP controller and connect your sensors and/or actuators using RJ45 cables.

Only then hook up the power supply using a spring-loaded terminal.

Configure your controller as described in Chapter "Configuring the IMPACT20 in RSLogix50004.2.3", for example to a RSLogix5000 controller.



Before starting the setup, make sure you check that the fieldbus is connected properly in accordance with the system structure.



Each device type possesses an EDS file (*.eds) and a graphic (*.bmp). See more details in Chapter "4.2.1 EDS Files".

4.1.1 Assigning and Setting the IP Address

4.1.1.1 Issuing Addresses using the BCD Rotary Switch

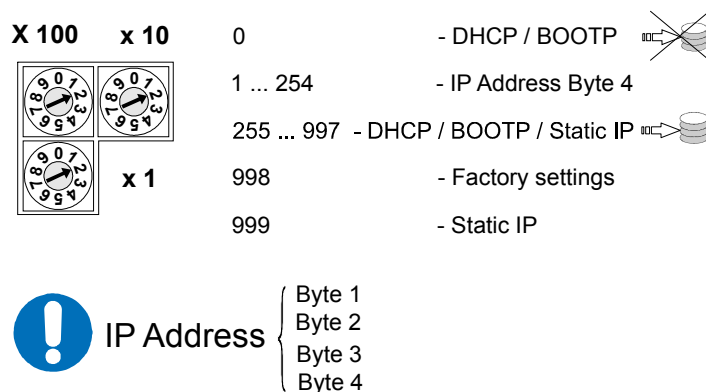




Fig. 16: Issuing addresses using the BCD rotary switch

Set the operating mode using the three rotary switches to obtain the IP address of the module:



When issuing addresses, please note the following:

Every Ethernet user must be assigned an unambiguous and unique IP address in the network.

Position/Range	Settings
Position 0:	IP address request per DHCP (default), or BOOTP without saving ()
Range 1 to 254:	Setting the last byte of the IP address (default 192.168.100.xxx)
Range 255 to 997:	IP address request per DHCP (default), or BOOTP with saving () The search for an IP address only takes place if the setting DHCP or BOOTP was selected in the web server (Slot 000 / Properties). If STATIC was selected, the stored IP address is used.
Position 998:	Accept factory settings
Position 999:	Use static IP (default 192.168.100.6)

Tab. 2: Setting the IP address using the rotary switches



It is only possible to set the DHCP and BOOTP modes to refer to the IP address in the web server.

Note down the MAC ID printed on the underside of the housing and set the rotary switches to the required positions. Boot your DHCP or BOOTP server and assign the required IP address to the module MAC ID that you noted down earlier. After the system is booted, start the service you require depending on the service you selected, and fetch the IP address from the server. If you saved the IP addresses, set all rotary switches to "999", otherwise this service is re-executed after every reboot.



The rotary switch settings are loaded once after applying the power supply. Any change only becomes effective after a power reset. If you want to use a saved IP address, set the rotary switch to 999.



When you issue an IP address or a subnet mask, make sure it corresponds to your actual network configuration. If you make a false input, you may no longer be able to reach your module under certain circumstances. Therefore, first contact your system administrator!



If the IP address is obtained from a DHCP/BOOTP server, the module requests an IP address only within 60 seconds after switchon. Make sure that a DHCP/BOOTP server is running when the module is switched on.

Switch position "255 to 997"

Use this switch position when you want to store the IP address in the bus node and obtain the address from a BOOTP or DHCP server. It is then possible to switch over the bus node to static IP address. The stored IP address is used. Use the web server to perform the switchover.

If you set the bus mode to a static IP address, the device expects an address to be issued by a DHCP/BOOTP server every time the device is switched.

Switch position "998"

The bus node factory settings are reactivated in switch position "998". The IP configuration, the I/O module settings, the diagnostic methods, and the number of diagnostic buffers are reset.

4.1.1.2 Issuing Addresses using DHCP / BOOTP



If you want to issue an IP address using DHCP or BOOTP, the IMPACT20 module sends only four DHCP requests or four BOOTP requests.

Note down the MAC ID printed on the right side of the housing and set the rotary switch to the required position. Boot your DHCP or BOOTP server and assign the required IP address to the MAC ID of the module that you noted down earlier. After system boot, the IP addresses are obtained from the server. If you saved the IP addresses, now set all rotary switches to "999", otherwise this service is re-executed after every reboot.



The rotary switch setting is loaded once after applying the power supply. Any change only becomes effective after a power reset. If you want to use a saved IP address, set the rotary switch to 999.



CAUTION:

When you issue an IP address or a subnet mask, make sure it corresponds to your actual network configuration. If you make a false input, you may no longer be able to reach your IMPACT20 system under certain circumstances. Therefore, first contact your system administrator!

4.1.1.3 Issuing Addresses using the Web Server

The method or the IP address can be set in the web server under the "**Edit IMPACT20**" link under the "**Properties**" tab..

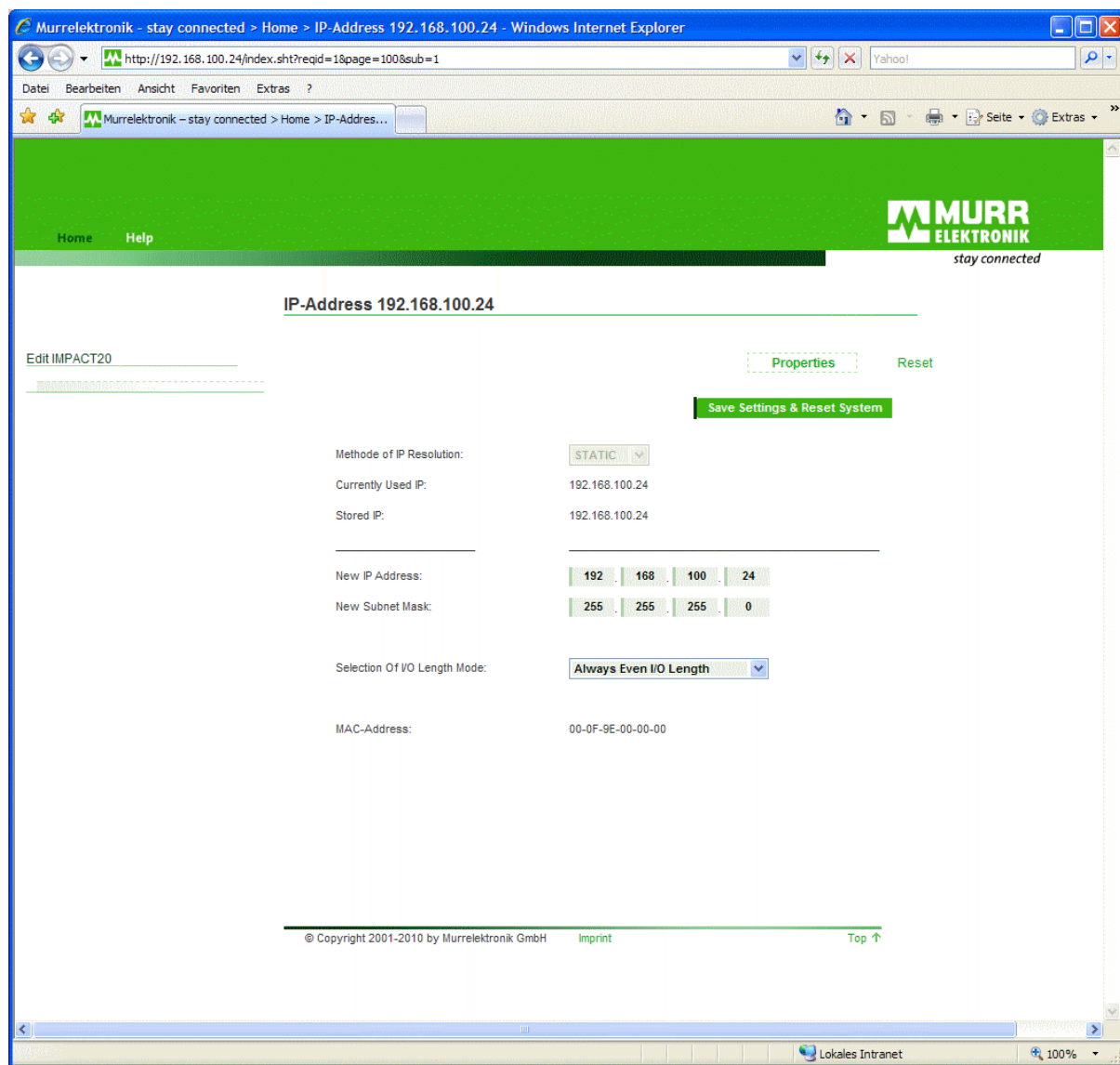


Fig. 17: Setting the IP in the web server

Display	Description
„ Method of IP Resolution “	<p>To select the method, use the selection menu next to "Method of IP Resolution". Click on the method you require. If you select "Static", the saved IP address is used at the next reboot irrespective of the switch setting, and no DHCP or BOOTP request is sent.</p> <p>Below that, the screen displays the currently used and saved IP address. Please note that the two addresses may be different.</p>

Display	Description
„ New IP Address “ „ New Subnet Mask “	You can enter a new IP address or subnet mask next to the " New IP Address " and " New Subnet Mask " selection boxes.
„ Save Settings & Reset System “	When you have completed all the settings, please press the " Save Settings & Reset System " button to save all your settings. Execute an IMPACT20 system reset to activate the changed settings.
„ Selection of I/O Length Mode “	In the "Selection of I/O Length Mode" field, set whether you want the device to work with even I/O data lengths or whether the data length should remain unchanged. True I/O Length: The data length leaves unchanged. Always Even I/O Length: With odd data length a byte is added.
„ MAC-Address “	Shows the MAC Address of the device.



The function of the "Static" setting in the "Method of IP Resolution" list box means there is no IP address inquiry over DHCP or BOOTP, even when the switch position is set to 255 to 998 or 0. Instead, the address that is already saved is used.

4.2 Factory Settings

The factory settings are:

Description	Value
Method of IP Resolution	DHCP
Currently Used IP	192.168.100.6
Stored IP	192.168.100.6
Subnet Mask	255.255.255.0
Selection of I/O Length Mode	True I/O Length

Tab. 3: Factory settings

There is no stored configuration in the device. The factory settings can be restored by setting the rotary switch to "998".

4.2.1 EDS Files

The EDS file is created explicitly for the module type (I/O). The consequence is that, in the IMPACT20 series, each module is assigned a unique EDS file with the affix "*.eds". The modules are also assigned a uniform icon with the suffix "*.ico".

The EDS file contains a lot of information concerning the module e.g.: device type, manufacturer, vendor ID, article number, software version, hardware version, etc.



EDS files are module-specific. Only Murrelektronik technical personnel are allowed to perform application-specific modifications.

EDS files are assigned as shown in the table below:

Module type	Name of EDS file	Name of icon
IMPACT20 E DI16	IMPACT20-E DI16 56916.eds	IMPACT20.ico
IMPACT20 E DI8 DO8	IMPACT20-E DI8 DO8 56917.eds	IMPACT20.ico
IMPACT20 E DO16	IMPACT20-E DO16 56918.eds	IMPACT20.ico

Tab. 4: EDS files



The latest EDS files are downloadable over the web from:

<http://www.murrelektronik.com>. Navigate to the **download section under configuration files**.

4.2.2 IMPACT20 Web Server

All IMPACT20 EthernetIP modules have a web server that is accessible via the IP address of each module.

To ensure the correct graphic display, please install the latest version of a web browser on your PC (Mozilla Firefox Version 3.5 or higher, or Microsoft Internet Explorer, Version 7.0 or higher).

The start page provides you with information on the connected module:

- Size of assembly instances
- Article number

- Software version

You can retrieve the software versions of the firmware, its date of creation, and the version of your web under the option "Help -> Version Info".



When you issue an IP address using the web server, please refer to Section 4.1.1.

4.2.3 Configuring the IMPACT20 in RSLogix5000

The procedure may differ slightly depending on the controller used. In this example, a CompactLogix from Allen Bradley is used.

Go to the backplane and your EtherNET port in RSLogix5000 under option "**I/O Configuration**". Click right on "**Ethernet**" and select "**New Module**".

The screen below appears:

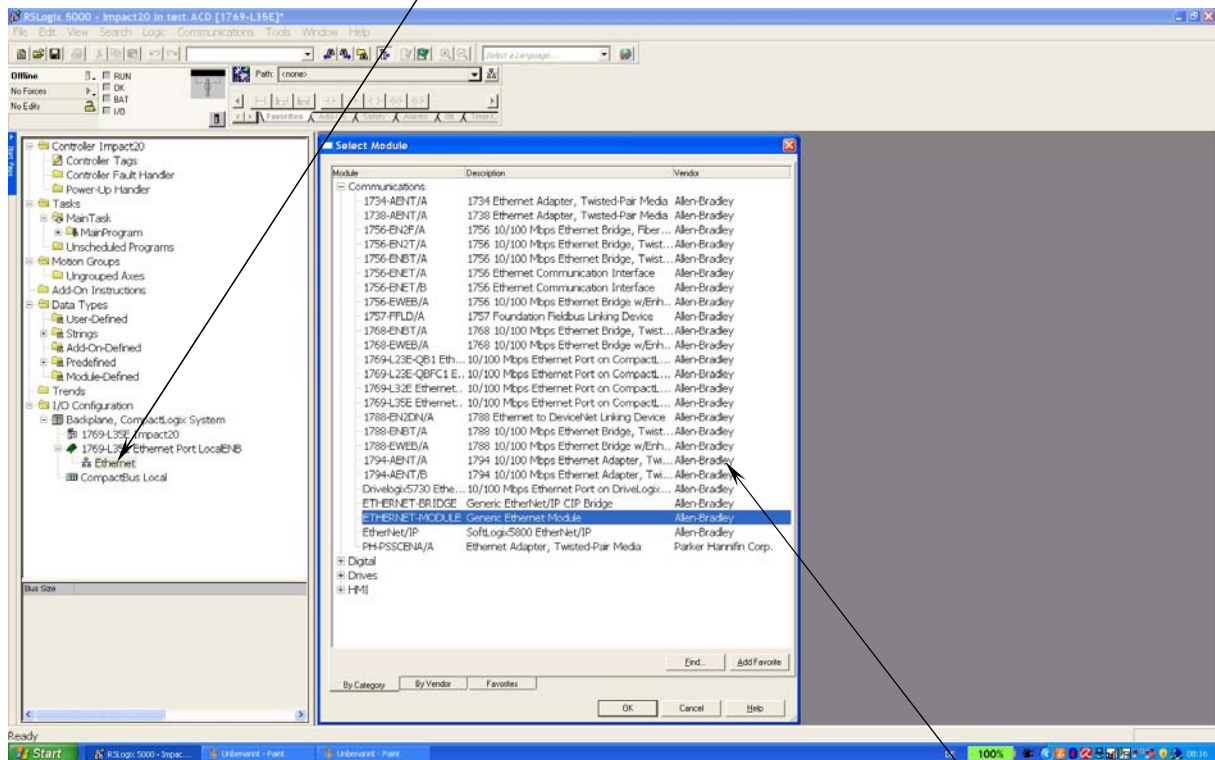


Fig. 18: RSLogix5000 generic Ethernet modules

Expand the "**Communications**" menu option and select the module "**Ethernet Module – Generic Ethernet Module**".



When you configure the module RSLogix, make absolutely sure that you select "Ethernet Module - Generic Ethernet Module".

Then enter the required parameters.

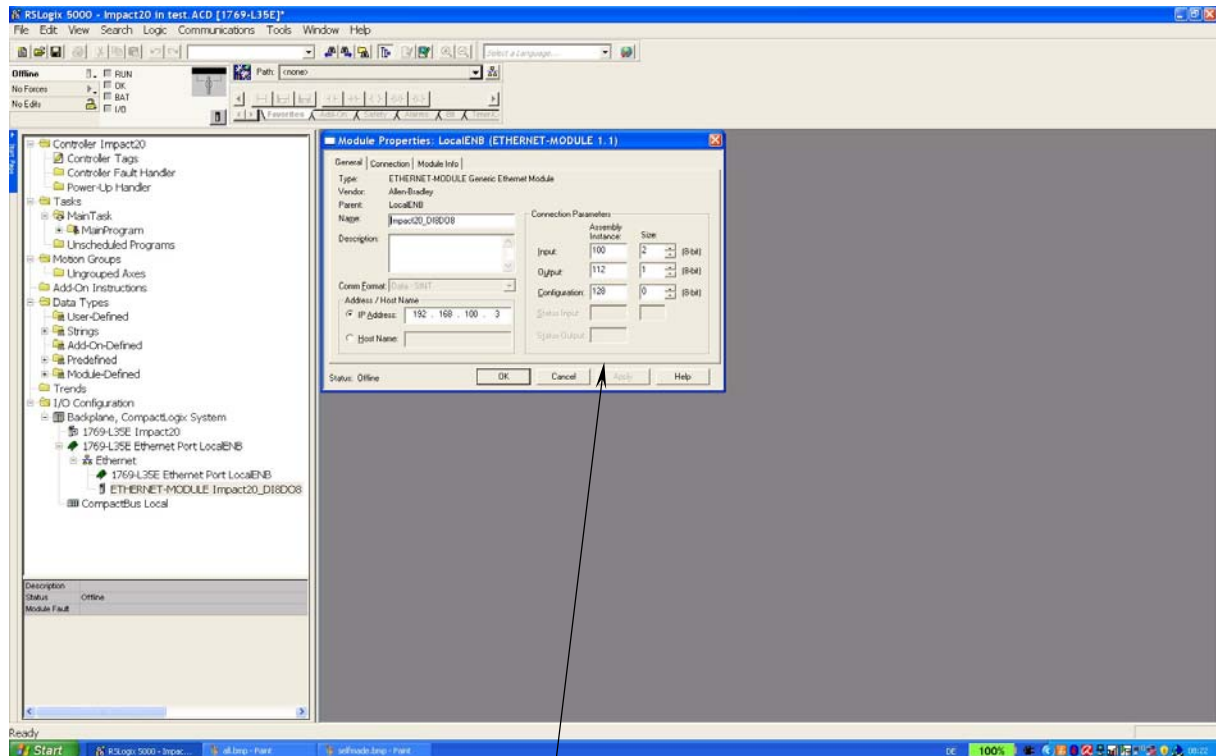


Fig. 19: RSLogix – Entering data lengths

The bus node uses the following instances:

- Inputs: Assembly Instance 100_{dec}
- Outputs: Assembly Instance 112_{dec}
- Configuration Assembly Instance 128_{dec}



Please note that the instance 128_{dec} is not supported for the configuration and therefore the size must always be ZERO!



Please note that IMPACT20 calculates data lengths in bytes. For this reason, make sure you set the correct data type, in our example SINT (8 bits).

Set the RPI time in the "**Connection**" tab. The default RPI is 10 ms.

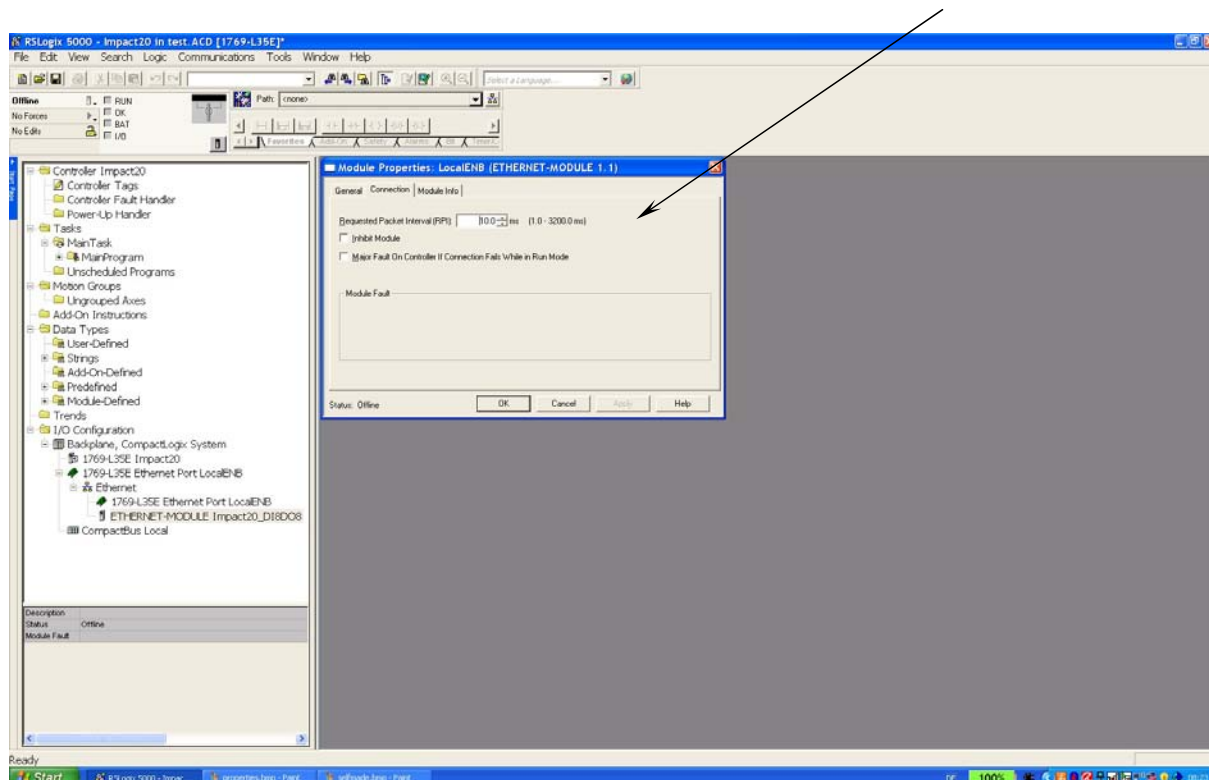


Fig. 20: RSLogix5000 Setting the RPI time

When you have completed all the settings, click on the "OK" button. Go to the Offline button and download the configuration to the controller. Based on the previous data settings, the controller verifies the correct data lengths and instances, and if correct, establishes the connection with the bus node. The bus node then switches the NS-LED to static green.



Configurations that require RPI times under 10 ms must first be tested for correct operation.



The minimum RPI time supported by IMPACT20 is 5 ms!

4.2.4 I/O Data

4.2.4.1 True I/O Length Mode

The table displays the input and output instances for each module with the corresponding length:

Module	Assembly Instance Input	Assembly Instance Output	Assembly Instance Configuration
IMPACT20 E DI16 Art. No. 56916	100 _{dec} Length: 3 (8 bits)	112 _{dec} Length: 1 (8 bits)	128 _{dec} Length: 0
IMPACT20 E DI8 DO8 Art. No. 56917	100 _{dec} Length: 3 (8 bits)	112 _{dec} Length: 1 (8 bits)	128 _{dec} Length: 0
IMPACT20 E D016 Art. No. 56918	100 _{dec} Length: 3 (8 bits)	112 _{dec} Length: 2 (8 bits)	128 _{dec} Length: 0

4.2.4.2 Always Even I/O Length Mode

The table displays the input and output instances for each module with the corresponding length:

Module	Assembly Instance Input	Assembly Instance Output	Assembly Instance Configuration
IMPACT20 E DI16 Art. No. 56916	100 _{dec} Length: 4 (8 bits)	112 _{dec} Length: 2 (8 bits)	128 _{dec} Length: 0
IMPACT20 E DI8 DO8 Art. No. 56917	100 _{dec} Length: 4 (8 bits)	112 _{dec} Length: 2 (8 bits)	128 _{dec} Length: 0
IMPACT20 E D016 Art. No. 56918	100 _{dec} Length: 4 (8 bits)	112 _{dec} Length: 2 (8 bits)	128 _{dec} Length: 0

4.2.4.3 I/O Data IMPACT20 E DI16 Art. No. 56916

Manufacturer-specific format with 16-bit inputs and group diagnostics for the module. Assembly instances 100_{dec} and 112_{dec} are used.

Assembly instance 100_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input channel 13	Input channel 12	Input channel 11	Input channel 10	Input channel 03	Input channel 02	Input channel 01	Input channel 00
1	Input channel 33	Input channel 32	Input channel 31	Input channel 30	Input channel 23	Input channel 22	Input channel 21	Input channel 20
2	Reserved	Reserved	Reserved	Reserved	Reserved	Sensor short-circuit diagnostic	Reserved	Sensor power supply undervoltage diagnostic
3	0x00							



Dashed line:

The „Always Even I/O Length Mode“ adds a further bit.

Assembly instance 112_{dec}:

Reserved

4.2.4.4 I/O Data IMPACT20 E DI8 DO8 Art. No. 56917

Manufacturer-specific format with 8-bit outputs, group diagnostic for the module, actuator short-circuit diagnostic channel-wise, and with 8-bit outputs. Assembly Instances 100_{dez} and 112_{dez} are used.

Assembly instance 100_{dez}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input channel 13	Input channel 12	Input channel 11	Input channel 10	Input channel 03	Input channel 02	Input channel 01	Input channel 00
1	Reserved	Reserved	Reserved	Reserved	Group signal Actuator short-circuit diagnostic	Sensor short-circuit diagnostic	Actuator power supply undervoltage diagnostic	Sensor power supply undervoltage diagnostic
2	Actuator short-circuit channel 33	Actuator short-circuit channel 32	Actuator short-circuit channel 31	Actuator short-circuit channel 30	Actuator short-circuit channel 23	Actuator short-circuit channel 22	Actuator short-circuit channel 21	Actuator short-circuit channel 20
3	0x00							

Assembly instance 112_{dez}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 33	Output channel 32	Output channel 31	Output channel 30	Output channel 23	Output channel 22	Output channel 21	Output channel 20
1	0x00							



Dashed line:

The „Always Even I/O Length Mode“ adds a further bit.

4.2.4.5 I/O Data IMPACT20 E DO16 Art. No. 56918

Manufacturer-specific format with 16-bit outputs, group diagnostic for the module, actuator short-circuit diagnostic channel-wise, and with 16-bit outputs. Assembly instances 100_{dec} and 112_{dec} are used.

Assembly instance 100_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Group signal Actuator short-circuit diagnostic	Reserved	Actuator power supply undervoltage diagnostic	Sensor power supply undervoltage diagnostic
1	Actuator short-circuit channel 13	Actuator short-circuit channel 12	Actuator short-circuit channel 11	Actuator short-circuit channel 10	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00
2	Actuator short-circuit channel 33	Actuator short-circuit channel 32	Actuator short-circuit channel 31	Actuator short-circuit channel 30	Actuator short-circuit channel 23	Actuator short-circuit channel 22	Actuator short-circuit channel 21	Actuator short-circuit channel 20
3	0x00							

Assembly instance 112_{dec}:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 13	Output channel 12	Output channel 11	Output channel 10	Output channel 03	Output channel 02	Output channel 01	Output channel 00
1	Output channel 33	Output channel 32	Output channel 31	Output channel 30	Output channel 23	Output channel 22	Output channel 21	Output channel 20



Dashed line:

The „Always Even I/O Length Mode“ adds a further bit.

5 Diagnostics and LED Displays

All IMPACT20 modules have separate and well arranged LEDs for device and I/O status. These displays are located on the front of the device.

The following diagnostics are displayed visually and signaled over the fieldbus:

- Sensor short-circuit as group signal
- Actuator short-circuit channel-wise and group signal
- Module power supply undervoltage UI (module power supply is less than 18 V).
- Actuator power supply undervoltage UA (actuator power supply is less than 18 V).

5.1 Function of Bus Status LEDs

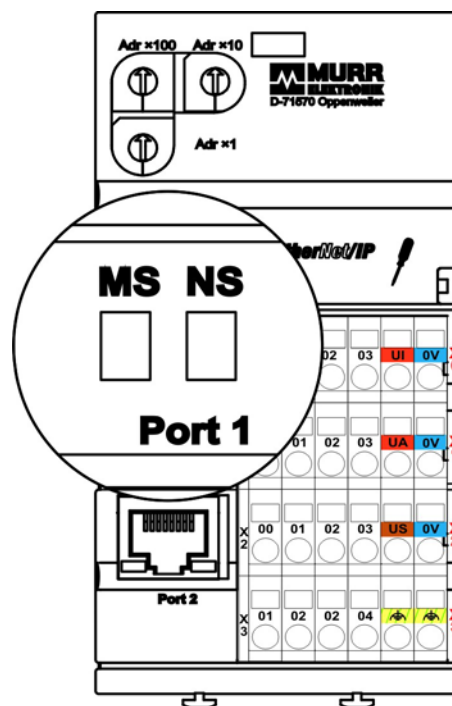











Fig. 21: PROFINET module: Bus LEDs

The device performs a self-test as soon as the IMPACT20 is powered over the bus. The self-test lasts for approx. 2 s. It is followed by the DupMac Test. This checks whether there are other modules with an identical MAC ID on the bus. On completion of the DupMac Test, the NS-LED flashes green. If the

DupMac Test fails, the NS-LED lights up red and a free address must be set using the rotary switches on the module. A power reset must be performed.

5.1.1.1 Signal States of Bus Status LEDs

Bus status LEDs on module front panel

LED Designation	LED Display	Response	Meaning
MS		off	Device is off
MS		green	Operational, device in service
MS		green / red flashing	Self-test
NS		off	Device is off Device has no IP address
NS		flashing green	IP address exists but no connection to the Master
NS		green	Connection to Master exists
NS		flashing red	At least one connection has timeout
NS		red	The module detected that its IP address is used by a different device
NS		green / red flashing	Self-test

Tab. 5: Bus status LEDs on module front panel

5.2 Module and Actuator Power Supplies

An LED is provided for each of the module power supply terminals "UI" and actuator power supply terminals "UA".

- The LEDs under "**UI**" show the status of the module and sensor power supplies.
- The LEDs under "**UA**" show the status of the digital outputs.

5.2.1 Threshold Values of the Module Power Supply UI

There are two thresholds for undervoltage detection:




12 V < UI < 18 V	The device continues to function but <ul style="list-style-type: none">• The UI LED lights up red.• The associated diagnostic was transferred to the Master.
< 12 V	The device performs a power reset. All outputs are reset to 0.

5.2.2 Threshold Values of the Power Supply UA

There is one threshold for undervoltage detection:

12 V < UA < 18 V	The device continues to function but <ul style="list-style-type: none">• The UA LED lights up red.• The associated diagnostic was transferred to the Master.
< 12 V	<ul style="list-style-type: none">• The UA LED is off.• All outputs are reset to 0.

5.2.3 LED Displays UI and UA

LED Displays UI and UA	Response	State
	Green	Power supply OK (≥ 18 V)
	Red	Undervoltage (< 18 V)
	Off	Voltage \leq approx. 12 V

Tab. 6: LED module power supply





Please note that the sensor power supply voltage (US terminal) is connected internally to the module power supply voltage (UI terminal). This ensures that the two terminals have the same voltage.

5.3 Signal-Logic Display and LED Response



A separate status display is assigned to every channel. This is labeled "00 to 03". The status display is located below the associated terminal and shows the status of the inputs and outputs.

5.3.1 Correlation Between Signal-logic Display and LED Response at the Input

LED Display		Logic Value	Voltage at Input	Signal
	Off	0	< 11 V	Input with NO contact function
	yellow	1	11 to 30.2 V (dependent on US)	

Tab. 7: LED at input of digital modules

5.3.2 Correlation Between Signal-logic Display and LED Response at the Output



LED Display		Logic Value	Voltage at output	Signal
	Off	0	0 V	Output
	yellow	1	12 to 30.2 V (dependent on UA)	

Tab. 8: LED at output of digital modules

5.4 Short-Circuit or Overload of Sensor Power Supply US

Reaction of IMPACT20 modules to short-circuit or overload of sensor power supply:

- The bus transmits the diagnostic data to the Master.
- The diagnostic LED at the associated terminal lights up red.

LED Display US	Response	State
	Off	Power supply OK
	Red	Overload or short-circuit of sensor power supply.



Tab. 9: LED periphery power supply

After rectification of the overload or short-circuit, the sensor power supply is immediately available again.

5.5 Short-Circuit or Overload of Actuators

Response of IMPACT20 modules to short-circuit or overload of outputs:

- The bus transmits diagnostic data to the Master.
- The diagnostic LED on the associated terminal lights up red.

LED Display	Response	State
	Off / yellow	Output with no overload / short-circuit
	Red	Output in overload / short-circuit case

Tab. 10: LED at output of digital modules

After rectifying the overload or short-circuit, the output is only available after UA switchoff or channel reset.

6 Technical Data

6.1 ETHERNET/IP IP20 Modules

	IMPACT20 P DI16 Art. No.: 56916	IMPACT20 P DI8 DO8 Art. No.: 56917	IMPACT20 P DO16 Art. No.: 56918
General			
Terminals X0 and X1	16 inputs	8 inputs	16 outputs
Terminals X2 and X3		8 outputs	
EMC			
EN 61131-2	Product standard		
EN 61000-4-2 ESD	Contact ± 4 kV, air ± 8 kV		
EN 61000-4-3 RF-Field & GSM	10 V/m		
EN 61000-4-4 Burst	± 2 kV DC inputs, ± 1 kV signal lines Asym./sym. ± 500 V		
EN 61000-4-5 Surge	Asym. ± 1 kV		
EN 61000-4-6 HF-asymmetric	10 V		
EN 61000-4-8 Magnetic field 50 Hz	30 A/m		
EN 55011 Emission	QP 40 dBµV/m (30 ... 230 MHz) QP 47 dBµV/m (230 ... 1000 MHz) Class B		
Ambient Conditions			
Operating temperature	0°C ... +55 °C		
Storage temperature	-20°C ... +70 °C		
Enclosure type according to EN 60529	IP 20		
Mechanical Ambient Conditions			
Oscillation according to EN 60068 Part 2-6	5 ... 60 Hz: constant amplitude 0,35 mm; 60 ... 150 Hz: constant acceleration 5 g		
Shock according to EN 60068 Part 2-27	Amplitude 15 g, 11 ms duration		
Miscellaneous			
Dimensions (LxWxH)	117 x 56 x 47 mm		
Mounting dimension (L xW)	117 x 56 mm		
Weight	Approx. 170 g		

	IMPACT20 P DI16 Art. No.: 56916	IMPACT20 P DI8 DO8 Art. No.: 56917	IMPACT20 P DO16 Art. No.: 56918
Bus Data			
Transfer protocol	Ethernet/IP		
Transfer rate	10/100 MBit/s, IEEE 802.3, Auto-Negotiation half- or full Duplex by 10 and 100 Mbit/s available, automatically settings		
Electrical isolation	500 V between bus and internal logic		
Vendor ID	640Dec		
Data length input and diag- nostics	Assembly Instance Input: 100; Size: 3 (8 bits)		
Data length output	Assembly Instance Output: 112; Size: 1 (8 bits)		
Data length configuration	Assembly Instance Configuration: 128; Size: 0		
Connection Possibilities			
Sensor and actuator supply	Cage clamp max. 2.5 mm ²		
Bus connection	2 x RJ45		
Sensor	4 x 4 terminal block connectors	2 x 4 terminal block connectors	-
Outputs	-	2 x 4 terminal block connectors	4 x 4 terminal block connectors
Maximum length of output cable	-	with 0.75 mm ² max. 10 m, with 0.34 mm ² max. 5 m	
Maximum length of input cable	< 30 m		-
Power Supply			
Operating voltage range logic UI	18 ... 30.2 V DC		
Current consumption (only, UI)	120 mA		
Actuator supply UA power over cage clamp connection	max. 8 A		
Reverse voltage protection module electronics	Yes		
Reverse voltage protection actuator supply	-	Yes	
Reverse voltage protection sensor supply US	Yes		-
Overvoltage protection	Yes (suppressor diode)		

	IMPACT20 P DI16 Art. No.: 56916	IMPACT20 P DI8 DO8 Art. No.: 56917	IMPACT20 P DO16 Art. No.: 56918
Inputs			
Number of inputs	16	8	-
Delay time for signal change	2 ms		-
Input characteristics	EN 61131-2, Type 3		-
Outputs			
Number of outputs	-	8	16
Switching frequency	-	approx. 50 Hz, 50% duty ratio	
Actuator current load	-	approx. 2 A per actuator	
Switching frequency inductive load	-	approx. 10 Hz	
Lamp load	-	max. 40 W	
Sensor power supply US			
Max. current	0.7 A		-
Short circuit protection for sensors with automatic restart	Yes		-
Reverse polarity protection	Yes		-

Tab. 11: Technical Data

6.1.1 Dimensioning

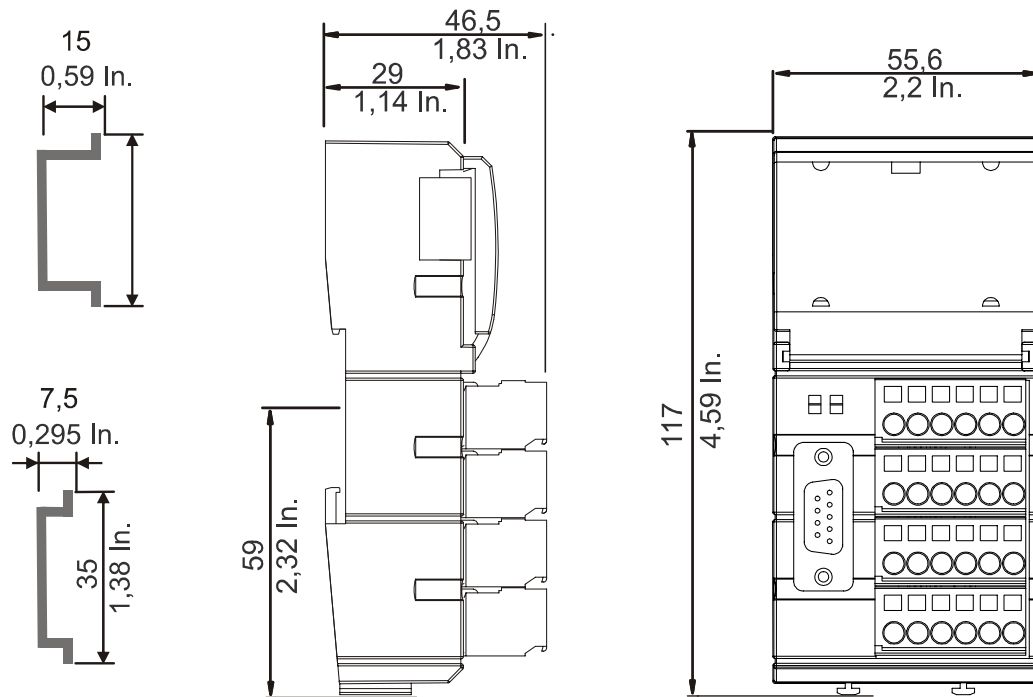


Fig. 22: Dimensioning



The dimensions of all IMPACT20 modules are identical.

7 Accessories

7.1 Label Sheets

Article Number	Description
56113	Label Sheets

Tab. 12: Accessories, Label Sheets

7.2 Coding Elements for Terminals

Article Number	Description
56115	Coding elements for terminals

Tab. 13: Accessories, Coding Elements for Terminals

7.3 Blind Plugs RJ45

Article Number	Description
58150	Blind plugs RJ45

Tab. 14: Accessories, blind plugs

7.4 Fieldbus Cables

Article Number	Description
7000-00000-8409999	Bus cable for EtherNet/IP, 100 m collar
7000-99711-7960060	Bus cable RJ45 – RJ45, straight 0.6 m
7000-99711-7960100	Bus cable RJ45 – RJ45, straight 1.0 m
7000-99711-7960150	Bus cable RJ45 – RJ45, straight 1.5 m
7000-99711-7960300	Bus cable RJ45 – RJ45, straight 3.0 m

Tab. 15: Fieldbus cables

7.5 Fieldbus Connectors

Article Number	Description
7000-99051-0000000	RJ45 Ethernet connector, straight shielded, 4-pin, IP20 self-connecting

Tab. 16: Fieldbus connectors

7.6 Fieldbus System Components

Article Number	Description	
58154	TREE 4TX	Unmanaged 4 Port Switch
58158	TREE 8TX	Unmanaged 8 Port Switch

Tab. 17: Fieldbus system components

7.7 I/O Cable



Murrelektronik offers a wide range of actuator and sensor products. This ranges from connectors, cables, and adapters through to special-purpose requirements.

Refer to our catalog or visit our inline shop at

www.murrelektronik.com.

7.8 Recommended Power Supply Units

Primary switched-mode power supply units from Murrelektronik are specially designed to power automation systems. For this reason, we recommend this system type to power modules.

Phases	Output power	Input voltage 95 to 132 VAC	Input voltage 185 to 265 VAC
1	240 W / 10 A	85086	85085
1	480 W / 20 A	85088	85087

Tab. 18: Recommended power supply units, MCS power+ single-phase

Phases	Output power	Input voltage 3 x 340 to 460 VAC
3	240 W / 10 A	85095
3	480 W / 20 A	85097
3	960 W / 40 A	85099

Tab. 19: Recommended power supply units, MCSPower+ three-phase



Murrelektronik offers a comprehensive selection of primary switched-mode power supply units. Refer to our catalog or visit our inline shop at www.murrelektronik.com.

7.9 MICO

MICO monitors currents

You can select a maximum individual current value for each channel and MICO monitors this value.

LED = green

MICO indicates when approaching the maximum load



There is a visual alarm when 90% of the selected current load is reached.

LED = green (flashing)

MICO detects over-stress

In case of short circuits or if the load current exceeds the selected value, MICO switches off the affected channel.

LED = red (flashing)

Article Number	Description	Current adjustment [A]	
9000-41034-0100400	MICO 4.4 (4 channels)	1, 2, 3, 4	
9000-41034-0100600	MICO 4.6 (4 channels)	1, 2, 4, 6	
9000-41034-0401000	MICO 4.10 (4 channels)	4, 6, 8, 10	
9000-41034-0101000	MICO 4.4.10 ACTUATOR-SENSOR (4 channels)	2 x 1, 2, 3, 4 2 x 4, 6, 8, 10	
9000-41034-0401005	MICO 4.10 SPEED-START (4 channels)	4, 6, 8, 10	
9000-41042-0100400	MICO 2.4 (2 channels)	1, 2, 3, 4	
9000-41042-0100600	MICO 2.6 (2 channels)	1, 2, 4, 6	
9000-41042-0401000	MICO 2.10 (2 channels)	4, 6, 8, 10	

Tab. 20: Overview of MICO variants



Murrelektronik offers a wide selection of products and accessories.

Refer to our catalog or visit our inline shop at

onlineshop.murrelektronik.com

7.10 Voltage Terminal Block

Article Number	Description
56078	Voltage terminal block gray / gray / brown / blue
56079	Voltage terminal block gray / gray / yellow / blue
56080	Voltage terminal block yellow / blue / yellow / blue
56081	Voltage terminal block brown / blue / brown / blue
56109	Voltage terminal block brown / brown / blue / blue
56110	Voltage terminal block blue / blue / yellow / yellow
56111	Voltage terminal block blue / yellow / brown / blue

Tab. 21: Voltage terminal block accessories

7.10.1 Description

Voltage terminal blocks are small aids that assist in the simple bridging or chaining of a required level or voltage.

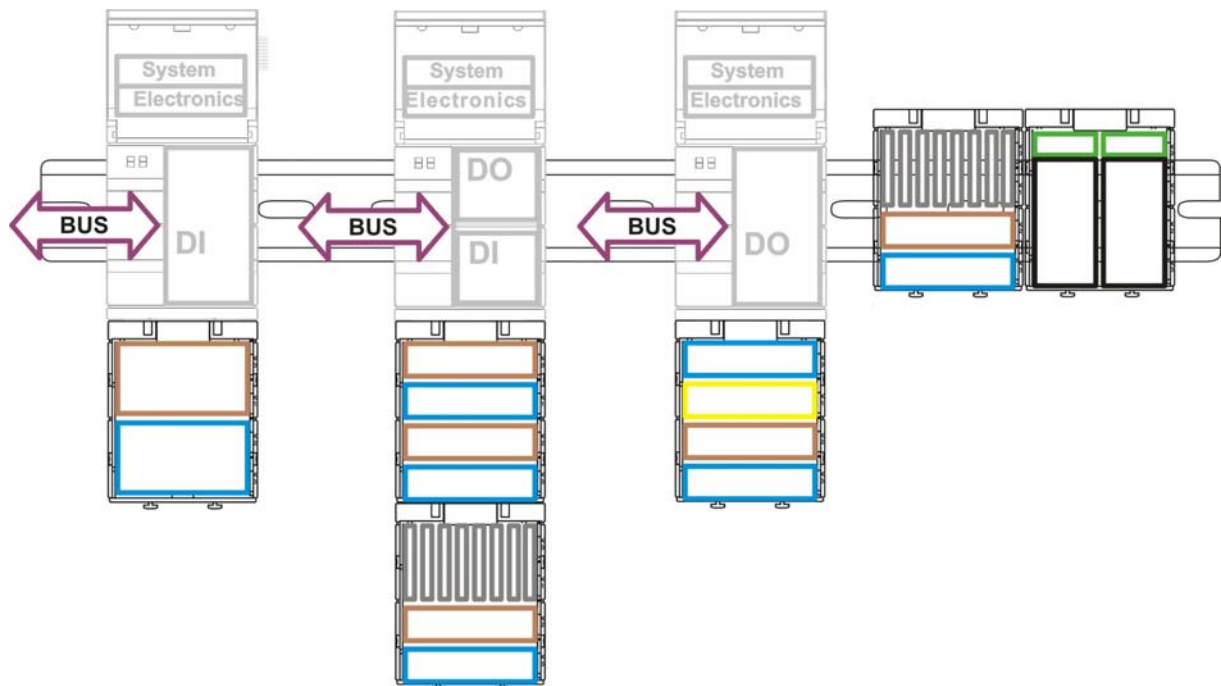


Fig. 23: Application information

7.10.2 Mounting Dimensions

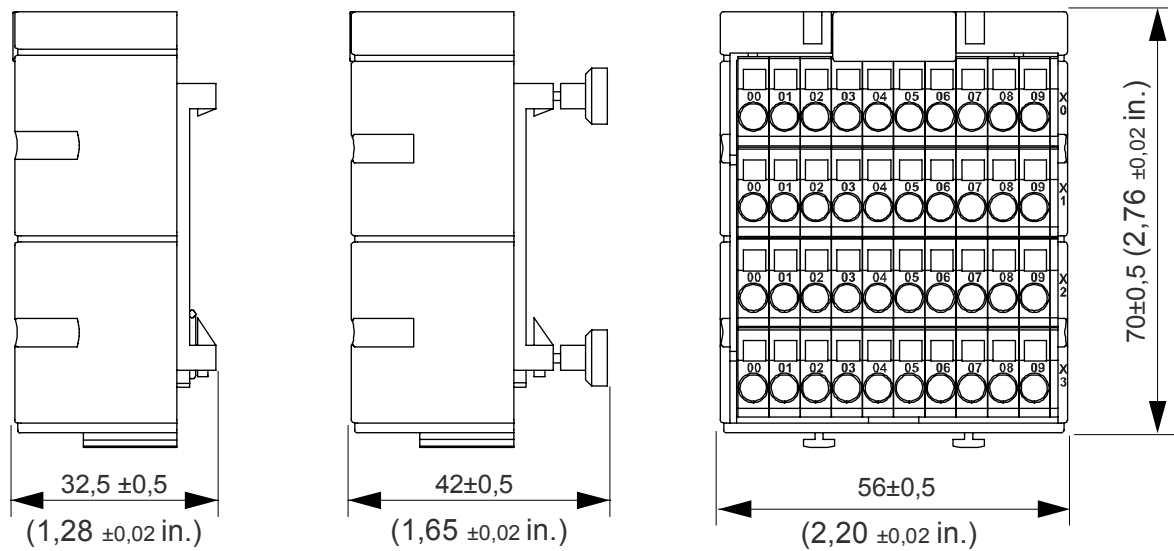


Fig. 24: Mounting dimensions

7.10.3 Mounting Position/Distances

Einbaulage / Mounting position

beliebig / any

Abstand / Distance

beliebig / any

7.10.4 Mounting on DIN Mounting Rail and on Module

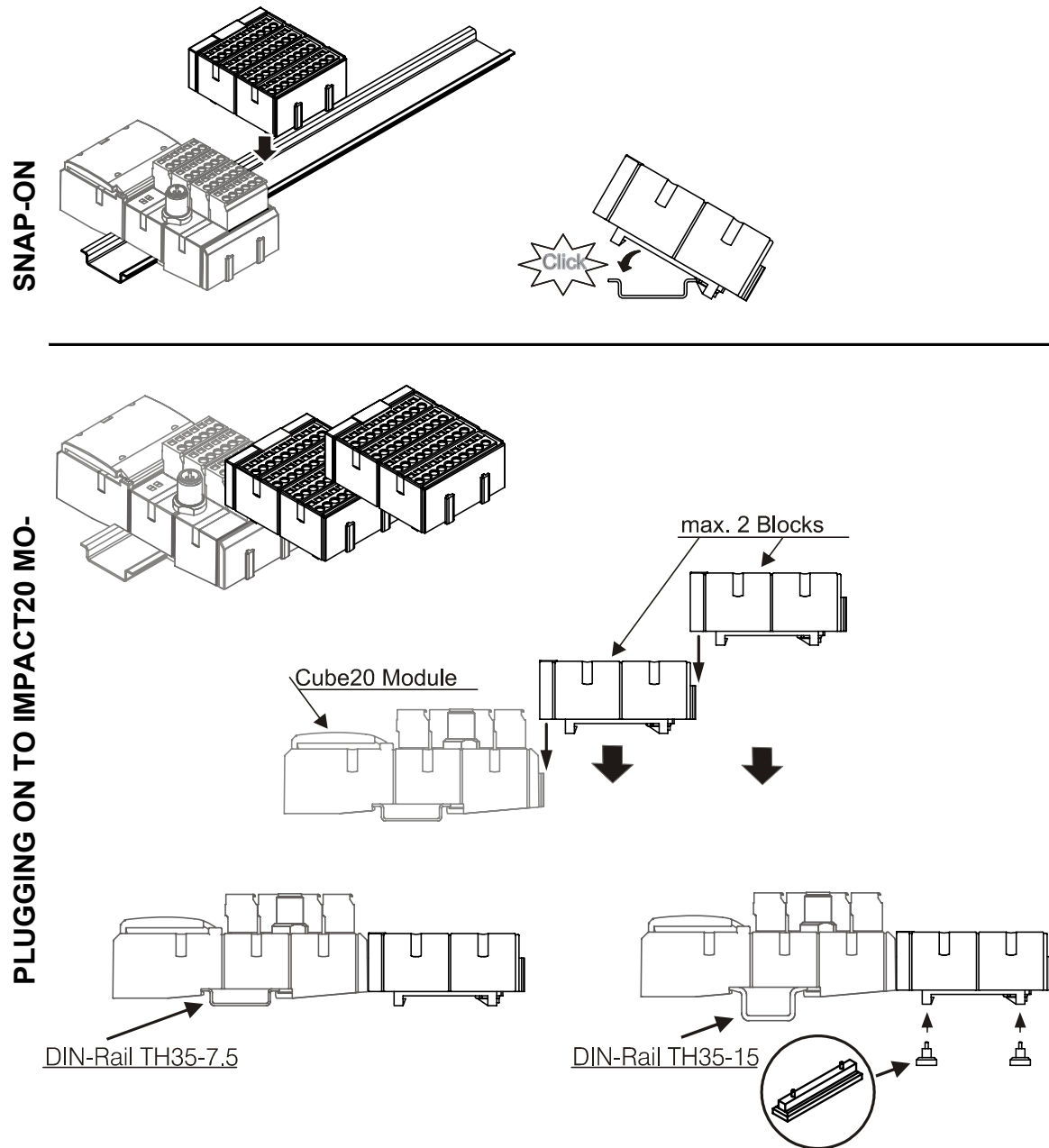
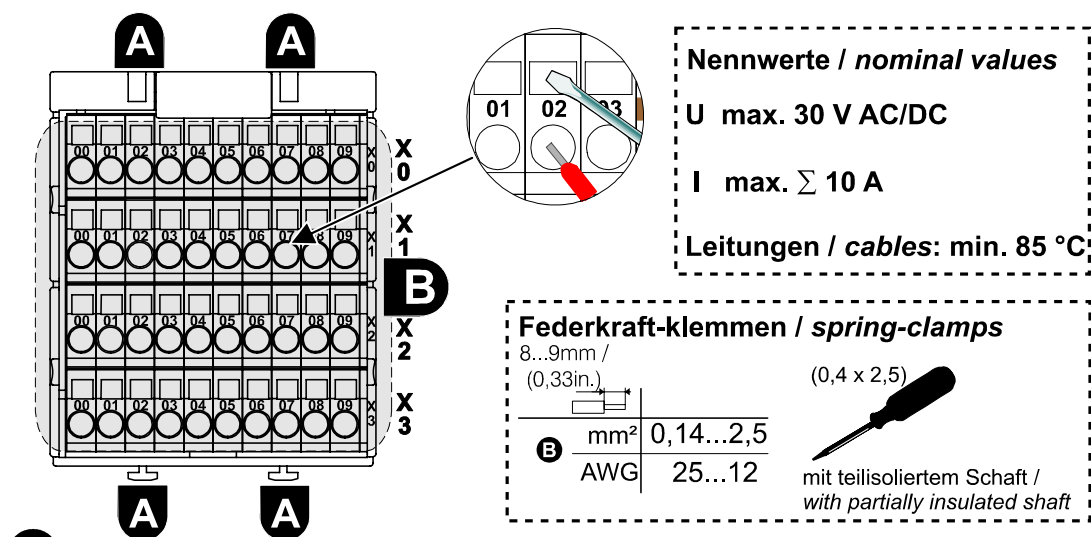


Fig. 25: Mounting the voltage terminal block on DIN mounting rails and on IMPACT20 module

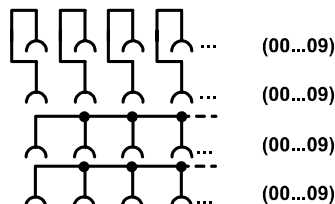
7.10.5 Installation

7.10.5.1 Terminal Overview Art. Nos. 56078, 56079, 56080, 56081, 56084, 56109, 56110, 56111

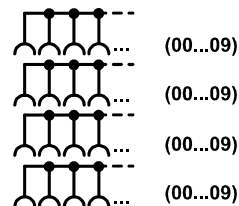


A Modulverbindung / Module-connection

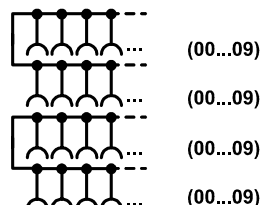
Art.-No. 56078	Art.-No. 56079	
X0 grau / grey	grau / grey	X0
X1 grau / grey	grau / grey	X1
X2 (Us +24 V) braun / brown	(FE) gelb / yellow	X2
X3 (0 V) blau / blue	blau / blue (0 V)	X3



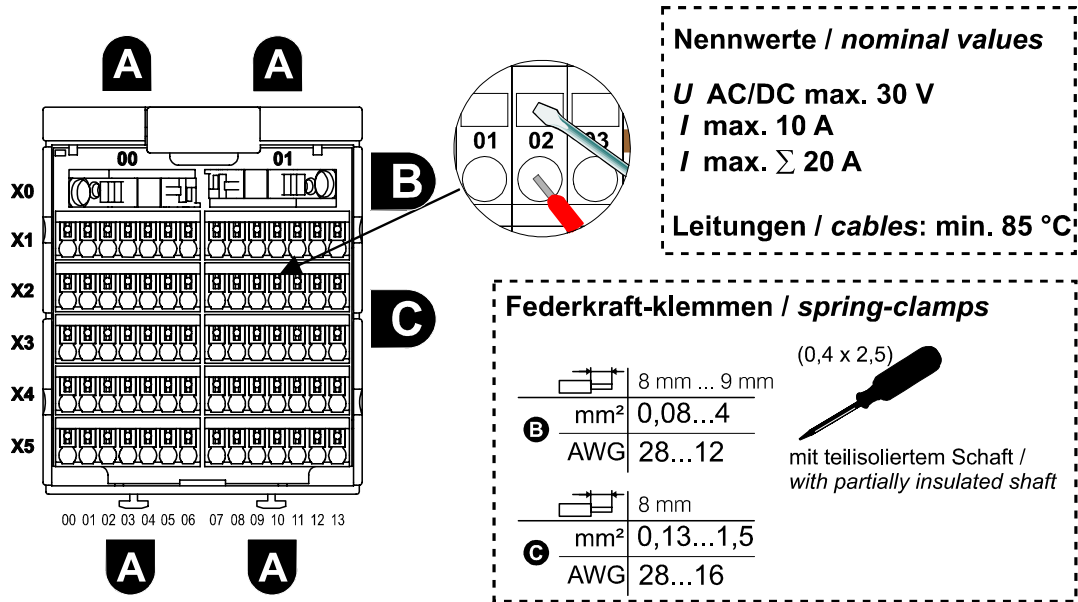
Art.-No. 56080	Art.-No. 56081	Art.-No. 56084	Art.-No. 56111	
X0 (FE) gelb / yellow	(Us +24 V) braun / brown	grau / grey	(0 V) blau / blue	X0
X1 (0 V) blau / blue	(0 V) blau / blue	grau / grey	(FE) gelb / yellow	X1
X2 (FE) gelb / yellow	(Us +24 V) braun / brown	grau / grey	(Us +24 V) braun / brown	X2
X3 (0 V) blau / blue	(0 V) blau / blue	grau / grey	(0 V) blau / blue	X3



Art.-No. 56109	Art.-No. 56110	
X0 (Us +24 V) braun / brown	(0 V) blau / blue	X0
X1 (Us +24 V) braun / brown	(0 V) blau / blue	X1
X2 (0 V) blau / blue	(FE) gelb / yellow	X2
X3 (0 V) blau / blue	(FE) gelb / yellow	X3



7.10.5.2 Terminal Overview Art. No. 56082



A Modulverbindung / *Module-connection*

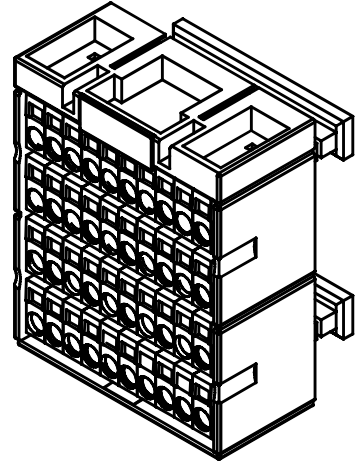
B Einspeiseklemme / *Input terminal*

C

	Art.-No. 56082				
X0	grün / green		(00)		(01)
X1	schwarz / black		(00...06)		(07...13)
X2	schwarz / black		(00...06)		(07...13)
X3	schwarz / black		(00...06)		(07...13)
X4	schwarz / black		(00...06)		(07...13)
X5	schwarz / black		(00...06)		(07...13)

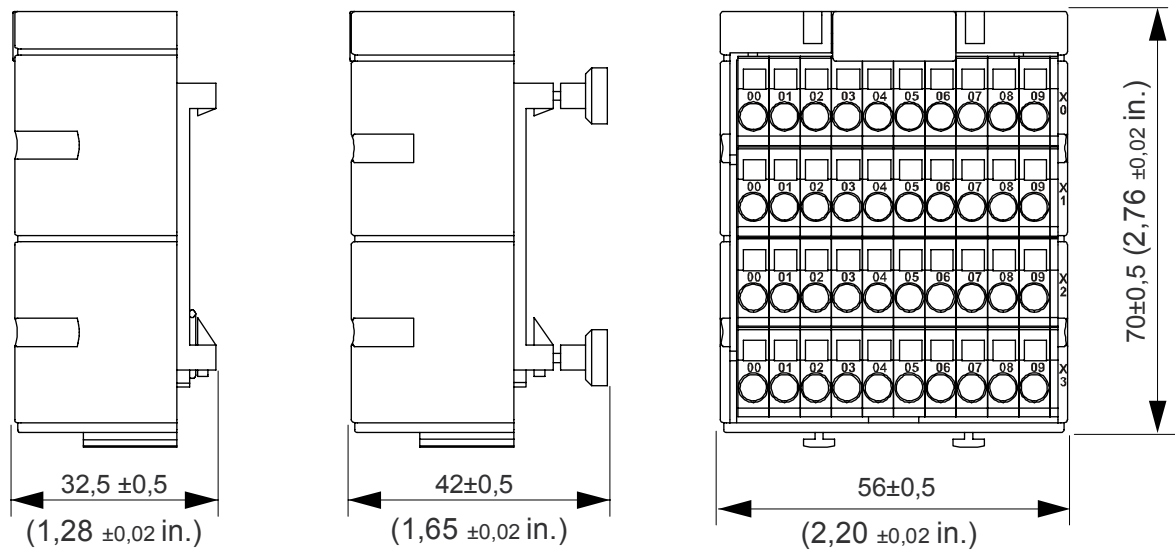
7.10.6 Technical Data of IMPACT20 Voltage Terminal Blocks

The IMPACT20 voltage terminal block is an expansion module for all IMPACT20 modules. It is fitted with 4 terminal rows that are electrically connected in various ways.



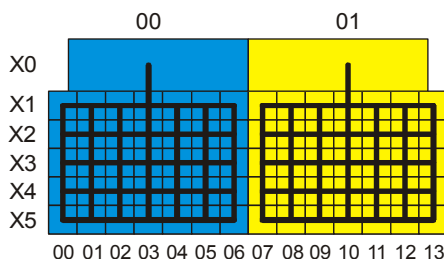

7.10.6.1 Technical Data Art. Nos. 56078, 56079, 56080, 56081, 56084, 56109, 56110, 56111

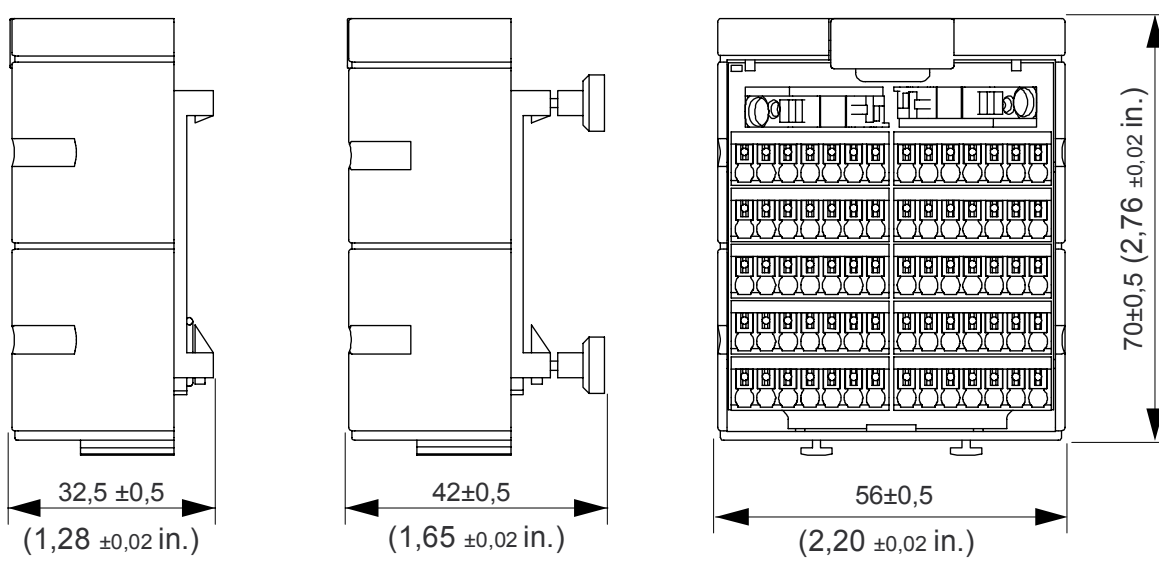
Technische Daten / Technical data	
Spannung / <i>voltage</i>	AC/DC max. 30 V
Strom / <i>current</i>	max. 10 A
Umgebungsbedingungen / Ambient conditions	
Arbeitstemperatur / <i>Operating temperature</i>	0°C to +55°C
Lagertemperatur / <i>Storage temperature</i>	-40°C to +85°C
Schutzart nach EN 60529 / <i>Enclosure type according to IEC 60529</i>	IP20
Mechanische Beanspruchung / Mechanical ambient conditions	
EN 60068 Part 2-6 Schwingprüfung / <i>Oscillation according to DIN IEC 60068 Part 2-6</i>	5 g
EN 60068 Part 2-27 Schockprüfung / <i>Shock according to DIN IEC 60068 Part 2-27</i>	15 g / 11 ms
Anschlussmöglichkeiten / Connection possibilities	
Federkraftklemmen / <i>spring clamps</i>	
Betätigungswerkzeug / <i>Operation tool</i>	mit teilisoliertem Schaft; / with partly insulated shaft Klinge / blade (2.5 x 0.4) mm
Anschlussquerschnitt / <i>Terminal cross-section</i>	0.14 mm ² to 2.5 mm ² , AWG 25 ... AWG 12
Abisolierlänge / <i>Stripping length</i>	8 mm to 9 mm 0.33 in.
Sonstiges / Miscellaneous	
Gewicht / <i>Weight</i>	70 g
Maße (L x B x H) / <i>Dimensions (L x W x H)</i>	



Montage / Mounting	
Einbaulage / Mounting position	beliebig / any
Abstand / Distance	beliebig / any

7.10.6.2 Technical Data Art. No. 56082

Art. No.	Benennung / Name	Ausführung / Construction
56082	Potenzialklemmenblock / Potential terminal block	
		gebrückt / <i>bridged</i> 
Technische Daten / Technical data		
Spannung / <i>voltage</i>	AC/DC max. 30 V	
Strom / <i>current</i>	max. 10 A	
	mit Leitungen für / <i>with cables for</i> min. 85 °C	
Summenstrom / <i>combined current</i>	20 A	
Umgebungsbedingungen / Ambient conditions		
Arbeitstemperatur / <i>Operating temperature</i>	0°C to +55°C	
Lagertemperatur / <i>Storage temperature</i>	-40°C to +85°C	
Schutzart nach EN 60529 / <i>Enclosure type according to IEC 60529</i>	IP20	
Mechanische Beanspruchung / Mechanical ambient conditions		
EN 60068 Part 2-6 Schwingprüfung / <i>Oscillation according to DIN IEC 60068 Part 2-6</i>	5 g	
EN 60068 Part 2-27 Schockprüfung / <i>Shock according to DIN IEC 60068 Part 2-27</i>	15 g / 11 ms	
Anschlussmöglichkeiten zwei Einspeiseklemmen / <i>Connection possibilities two Input terminals</i>		
Federkraftklemmen / <i>spring clamps</i>		
Betätigungswerkzeug / <i>Operation tool</i> (Wago No. 210-620)	mit teilisoliertem Schaft; / <i>with partly insulated shaft Type 2, Klinge / blade (3.5 x 0.5) mm</i>	
Anschlussquerschnitt / <i>Terminal cross-section</i>	0,08 mm² ... 4 mm², AWG 28 ... AWG 12	
Abisolierlänge / <i>Stripping length</i>	8 mm to 9 mm	

Anschlussmöglichkeiten 2 x 35 Potenzialklemmen / Connection possibilities 2 x 35 Potential terminals	
Push In Feder-Anschluss / <i>Push In spring connection</i>	
Anschlussquerschnitt / <i>Terminal cross-section</i>	0,13 mm ² ... 1,5 mm ² , AWG 28 ... AWG 16
Abisolierlänge / <i>Stripping length</i>	8 mm
Sonstiges / Miscellaneous	
Gewicht / <i>Weight</i>	107 g
Maße (L x B x H) / <i>Dimensions (L x W x H)</i>	
	

Montage / Mounting	
Einbaulage / <i>Mounting position</i>	beliebig / <i>any</i>
Abstand / <i>Distance</i>	beliebig / <i>any</i>

Glossary

Byte	Equivalent to 8 bits
DI	Digital Input
DIN	Deutsches Institut für Normung (German Standards Institute)
I/O	Input/Output
E/IP	Ethernet/IP
EC Directive 2004/108/EC	EMC Directive.
EMC	Electromagnetic Compatibility.
EN	European Standard
ESD	Electrostatic Discharge
FE	Function ground
EDS	The device master file describes the technical features of an ETHERNET/IP product. This file is required to configure an ETHERNET/IP system and is provided by the device manufacturer.
I	Current
I/O	Input/Output
IEC	International Electrotechnical Commission
IGMP	Internet Group Management Protocol
IP20	Ingress Protection, protection degree to DIN EN 60529 1st digit = protection against contact and foreign bodies 2nd digit = protection against water 2: Protection against the ingress of solid foreign bodies above a diameter of 12.5 mm, protection against access by finger 0: No protection against inclusion
ISO	International Standard Organization
LED	Light Emitting Diode
LSB	Least Significant Bit.
MSB	Most Significant Bit.
PAA	Process map of outputs
PAE	Process map of inputs
PELV	Protective Extra Low Voltage
Power-LED	LED to signal operating status
RPI	Requested Packet Interval
SELV	Safety Extra Low Voltage.
U	voltage

U/I	Voltage / current
US (brown terminal)	Sensor power supply (output)
UA (red terminal)	Actuator Power Supply
UI (red terminal)	Module and sensor power supply.
VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V. (Association of German Machinery and Industrial Equipment Manufacturers)
VZ	Sign (+ or -)
ZVEI	Zentralverband Elektrotechnik- und Elektronikindustrie e.V. (German Electrical and Electronic Manufacturers' Association).

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